THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES.

FEBRUARY, 1900.

SOME CASES OF DILATATION OF THE STOMACH.[1]

By John H. Musser, M.D.,
PROFESSOR OF CLINICAL MEDICINE, UNIVERSITY OF PENNSYLVANIA,
AND
J. Dutton Steele, M.D.,
INSTRUCTOR IN CLINICAL MEDICINE, UNIVERSITY OF PENNSYLVANIA.

The few cases of atonic dilatation of the stomach whose histories we have the pleasure of detailing are of interest because they were selected from patients of about the same age, the same sex, pursuing the same vocations, and, in a measure, possessed of similar habits. Moreover, they presented allied objective and subjective symptoms, and their true nature was recognized by resorting to the same methods of observation.

We take the liberty of presenting them conjointly, because as a result of our studies the same conclusions have been arrived at, and, therefore, the Section is not burdened with more than one paper. Our thoughts were led in the same direction because some of the cases were under our united professional care. The other cases were studied separately, but, as indicated above, presented such similarity that we thought it wise to group them in one report. These cases afford us the opportunity of stating some methods of diagnosis and points in etiology which we believe are worthy of consideration.

Case I. (J. H. M. and J. D. S.).—Male, aged twenty-four years; medical student; single. Parents both living; father is dyspeptic; mother is of a neurotic disposition. She has had attacks of articular

[1] Read before the Section on Medicine of the College of Physicians of Philadelphia, October 10, 1899.

rheumatism and nodular accumulations in the tendons in the region of the hand and fingers, and has numbers of tophi. One brother healthy and strong, but also inclined to be of a nervous disposition. Two sisters living and healthy.

The patient had children's diseases—measles, whooping-cough, mumps, and chickenpox—and slight rheumatism. No venereal disease, and knows of none in his family. Habits have been good as to alcohol and tobacco. Has had hay fever for three years past.

The present disease began in 1896, during the second year of his medical course. He managed to get through the year, although his symptoms gradually grew worse until he stopped work in May, 1897. He improved during the summer, and returned to work in October, 1897.

Soon after his return the same symptoms reappeared, and he was forced to leave the University for the year. During the two winters in the city he received treatment for lithæmia and chronic gastritis by means of diet and various drugs and tonics. During the spring and summer of 1898 he was employed in duties that kept him much in the open air, and he returned to study in the autumn, very much improved.

When first seen, in October, 1898, he presented the following symptoms: Dulness of intellect, slight tinnitus aurium, specks before the eyes, twitching of muscles of the face, no headache, but a feeling of dizziness; sounds seemed far off, and there was considerable mental depression. He complained of insomnia—it took him from one to four hours to get to sleep; he was not refreshed, and dreamed a great deal. He also complained of a bad taste in his mouth. The tongue was furred. He suffered from gaseous eructations, and sometimes directly after eating, but sometimes not until an hour or more had passed. There was practically never any regurgitation of food. As a rule, there was no pain, but sometimes he suffered from colic. Flatulence and borborygmus occasionally was quite decided. Stools were normal and regular. There was some twitching and tenderness of the muscles. There were, however, no signs of tetany. There were nodules in the cartilages of the ear and tendons of the hands.

Physical examination of the lungs and heart showed them to be healthy. The abdominal organs were in their normal position. The urine was of high color and specific gravity. It showed nothing abnormal, but was somewhat scanty. The blood-count showed 3,000,000 red cells per cubic centimetre. The skin was harsh and dry, and the hair was falling out. The stomach was washed out before breakfast, and about 100 c.c. of fluid, with small particles of food, were always obtained. Splashing could be heard in the stomach area before breakfast. The stomach was inflated with air repeatedly, and a considerable amount of dilatation without gastroptosis was always demonstrated by this method. The size and condition of the stomach did not change materially during the time in which he was under observation. An Ewald test breakfast was given, and one hour afterward 70 c.c. of fluid were obtained by aspiration. Hydrochloric acid was present in good quantity and lactic acid was also absent. Microscopical examination showed a few red blood-cells and considerable mucus. In washing out the stomach the water flowed in freely, and two or three litres were taken without discomfort. The return flow was, however, slow and unsatisfactory. The full amount sent in at any time was never recovered, and the washing never came away clear, even after forty minutes'

work. After Christmas he finally gave up his medical course and went to his home in the mountains of Northern Pennsylvania. He has since improved considerably, both in his general health and gastric symptoms.

CASE II. (J. D. S.).—Male, aged twenty-five years, single; student in the architectural department; born in the United States. Father and mother both living and well. No tubercular or rheumatic family history. There does not seem to be any neurotic taint in the family. The patient had measles, whooping-cough, and varicella in childhood. He appears to have been perfectly healthy, and led an active and outdoor life up to his seventeenth year in one of the States in the Northwest.

He does not smoke, but takes an occasional glass of beer. Has never had any venereal disease, and there is no history of sexual excess. He lived at home and led a regular life. In October of his eighteenth year he began work in a cold, damp office, and became somewhat indiscreet in his diet, using an excessive amount of sweets. He then began to suffer from frequent attacks of indigestion. In time a subacute gastritis appears to have developed. He complained of fulness in the epigastrium after eating, and pain in the same region, usually about three hours after eating. There was very little eructation. Constipation was often very obstinate. These symptoms were aggravated by any indiscretion in diet. He lost about eighteen pounds in weight. His gastric symptoms gradually grew worse. For the next six years he worked in an architect's office at draughting, using his eyes continuously, and during this period he suffered more or less with gastric trouble. In his summer vacation he says he was very well, and could eat almost anything.

In September, 1897, he came to the University, and soon after commencing work his gastric symptoms became much aggravated. He came under observation in January, 1899.

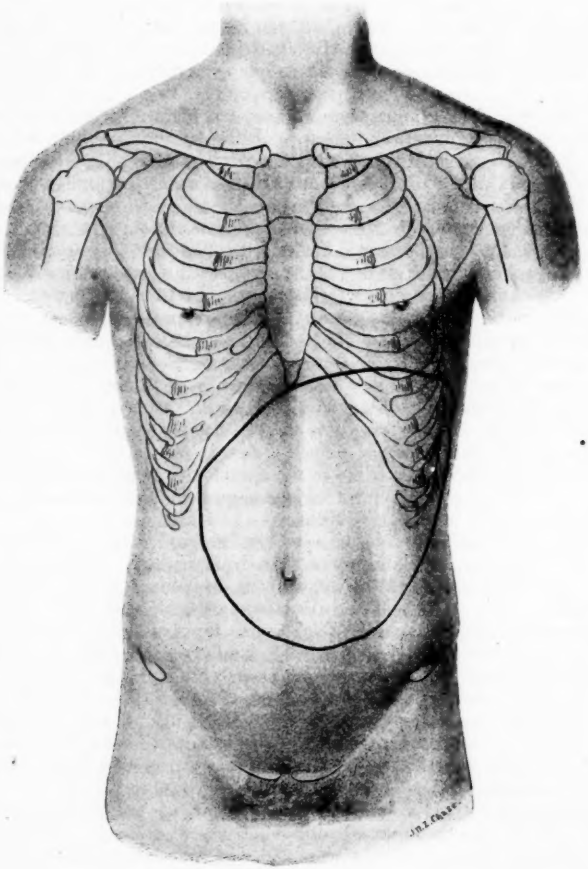
Examination at this time showed the lungs, heart, and abdominal viscera, except the stomach, to be free from disease. The urine was somewhat scanty and high-colored, but showed nothing upon examination except that the specific gravity was above the normal. He was slightly sallow and under weight for a man of his height.

His tongue was covered with a thick, white coating. He complained of fulness in the epigastrium and pain several hours after eating. No vomiting. There were eructations about an hour after eating of bitter, sour fluid, and an almost constant sour taste in the mouth. There was some insomnia and also mental inactivity, and considerable frontal headache. No muscular twitching; no symptoms of tetany. Knee-jerks were normal.

Examination of his stomach: By percussion the pylorus appeared to reach somewhat to the right of and below the umbilicus. The abdominal walls were relaxed. There were no peristaltic waves visible. About the lower border of the stomach there was distinct splashing. No point of tenderness and no tumor could be found. His stomach was washed out before breakfast, and by aspiration about 100 c.c. of fluid, mixed with mucus, were withdrawn. It was always difficult to withdraw the contents, and aspiration had to be resorted to. Expression always failed. Inflation showed the organ to extend below the umbilicus and three finger-breadths to the right.

An Ewald breakfast (a roll and one-half pint of fluid) in one hour gave 100 c.c. of fluid. Hydrochloric acid was present in small amount; lactic acid present. Some mucus, no blood, and no sarcinæ. The water flowed in easily, but it was difficult to empty the stomach and almost impossible to cleanse it thoroughly.

FIG. 1.



By inflation.

His work continued hard, and the aim of treatment was to enable him to graduate, and then to hope to relieve him by rest. However, he greatly improved, and by April 25th, while his stomach-wall was still much relaxed, as shown by inflation (Fig. 1), there was no fluid before breakfast, and the evidences of fermentation were almost gone

He slept better and could concentrate his mind to do more work. Examination of his gastric contents after a test-meal showed hydrochloric acid present, but no lactic acid.

Just after graduation, in June, his stomach was still relaxed, and he was in practically the same condition as in April. He was referred to Dr. Zimmerman in April, who reported considerable eye-strain, hypermyopia, and astigmatism. Correction by glasses relieved his headache, but seemed to have no marked effect upon his gastric symptoms. After going home he reported himself much improved by rest and the change of air.

CASE III. (J. H. M. and J. D. S.).—Male, aged twenty-eight years; medical student. Born in Pennsylvania; single. Family history is good except that mother has suffered much from acute articular rheumatism. One sister has had frequent attacks of rheumatism.

The patient's habits are good. Never took alcohol or smoked. No history of venereal disease. The patient had scarlet fever and diphtheria in childhood. Had an attack of lumbago at twenty-six years, but no other rheumatism. At sixteen years he had an attack of "nervous prostration" that lasted for six months, during which period he suffered considerably with weak, slow, and irregular heart and palpitation. His digestion was very poor, but the bowels were regular, and he had no fever. He recovered and became very strong and well, and led a healthy out-door life. He weighed 170 pounds.

He entered college in 1892, in perfect health. He had to work his way by canvassing in the summer, and this, with hard studying, almost broke him down in February, 1894, but he managed to graduate. He was suffering at that time with about the same symptoms as at present —insomnia, dulness, and inability to work, fulness in epigastrium after eating, but no constipation.

After graduation he came up quickly under complete rest, but had recurrences of the same trouble at intervals, when working hard, for the next two years. His meals were irregular and food not always of the best, and he has always eaten rapidly, with insufficient mastication.

After a summer of very hard work at his business he entered the medical school. In November he gave out completely. His symptoms were those given, but aggravated.

After a period of rest at home, with proper diet, he recovered a fair degree of health. He returned to the medical school, and by great care managed to get through the next two years, studying hard and working in the summer.

He came under observation May 3, 1899. He then had insomnia, muscular relaxation, and pains throughout the body. There was considerable pain in the epigastrium and left hypochondrium an hour or so after eating. There was much gurgling and some eructations of sour, bitter material, but no vomiting. There was considerable constipation. He suffered from attacks of bradycardia alternating with palpitation, especially after eating, and had considerable vertigo and dimness of vision.

Urine. Highly colored, lately rather scanty, and occasionally scalds him. Examination of it shows nothing abnormal, except a high specific gravity and an excess of indican. Thirst was not marked; and appetite fairly good.

Examination. Was not particularly emaciated, but sallow. He

weighed 130 pounds. No symptoms of tetany. Knee-jerks present, and pupillary reflexes normal. Teeth in fairly good condition. Tongue was heavily furred. Examination of lungs and heart showed them to be healthy. Liver, spleen, and kidneys appeared to be of normal size and location. There was no sign of either gastroptosis or enteroptosis.

Examination of the stomach showed considerable splashing about the level of the umbilicus. By percussion the pylorus appeared to be below and to the right of the umbilicus. The walls, as felt through the abdominal walls, seemed relaxed. No peristaltic wave could be invoked. No tumor could be discovered.

The stomach-tube passed before breakfast brings out 150 c.c. of greenish fluid. After an Ewald breakfast of several slices of toast and 500 c.c. of weak tea and milk, 100 c.c. were recovered by aspiration. The contents of the stomach could never be expressed, and were seldom evacuated through the tube by vomiting, but always had to be removed by aspiration. Water in lavage flowed in readily, but it was difficult to recover it.

Chemical examination of the fluid obtained after a test meal on several occasions showed the total acidity to be 54. Hydrochloric acid present and lactic and butyric acids absent. There was always much mucus raised through the tube.

Inflation of the stomach showed much relaxation. The result of this procedure varied very little while he was under observation.

The patient finished his year without much trouble, and seemed to gain slightly. After a summer in the open air he has greatly improved. His stomach now does not reach to the umbilicus, though he still suffers from fermentation. The stomach-tube shows no fluid in the fasting stomach before breakfast, and after an Ewald test breakfast 25 c.c. are obtained. The chemical examination is about the same as before. He has gained sixteen pounds.

CASE IV. (J. H. M.)—Male, aged twenty-two years; dental student. A native of the United States. His family history is good. Father, mother, one brother, and one sister alive and well. One sister died in babyhood. No rheumatic or tubercular family history.

The patient had pertussis and measles in childhood. Had also had mild attacks of influenza and a couple of attacks of chills and fever. He has used alcohol in moderation; has not had any venereal disease, but from his seventeenth year has smoked to great excess, mainly cigarettes, and has also chewed tobacco. In October, 1896, he began to experience palpitation and irregularity of the heart's action.

Soon signs of gastric disturbance were added, consisting of acid eructations, fulness after meals, no nausea, and regular bowels. He gradually grew worse, and in the fall of 1897 grew very anæmic, and entered the Presbyterian Hospital under Dr. Musser's care. He continued the use of tobacco until his admission into the hospital.

A note of the examination made then is as follows: "Patient has slept well since admission and has been very comfortable. There have been occasional eructations of acid material, but these have now disappeared. He looks very anæmic, but is always bright and cheerful. On one occasion in giving lavage he retained 4500 c.c. of water. This amount, however, caused him no inconvenience. His stomach has been dilated with air, and the stomach tympany was mapped out by auscultatory percussion."

The result showed that the greater curvature extended two finger-breadths below the umbilicus; the pylorus was on the right mid-clavicular line, on the costal margin, and the lesser curvature was on the level of the ensiform.

His blood-count upon January 24, 1898, was: Red cells, 4,100,000; white cells, 6000; hæmoglobin, 62 per cent. While in the hospital he was free from fever. The urine was about normal in amount and specific gravity.

Under appropriate treatment—lavage, rest, massage, and discontinuance of tobacco—he greatly improved. The gastric symptoms lessened, and on February 4th his blood-count was as follows: Red cells, 4,210,000; hæmoglobin, 72 per cent.

After leaving the hospital he returned home and led an active out-door life, with regular habits and without smoking to excess, until the autumn of 1898, when he again entered the dental school. He had taken fair care of himself, did not study excessively, and did not smoke to excess, except occasionally. In April, 1899, he again came under observation, complaining of some discomfort after eating, and occasionally acid eructations, but was feeling fairly well. The stomach-tube was passed, and his stomach was found to be empty before breakfast. He retained a pint and a half of water, which was recovered with ease. One hour after an Ewald breakfast but 25 c.c. of fluid could be recovered, mixed with much mucus. No free hydrochloric acid; no lactic acid. When the stomach was filled with air considerable dilatation was found. With attention to diet and simple medication his gastric symptoms soon disappeared entirely.

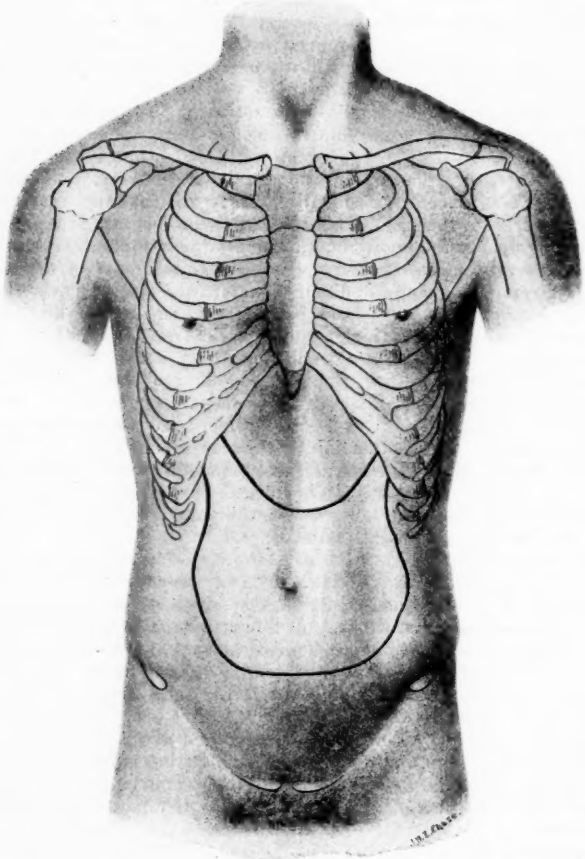
Case V. (J. H. M. and J. D. S.).—Male, aged twenty-two years; medical student. His mother and father are living and well, except that his mother has had some slight stomach trouble, evidenced by occasional attacks of gastritis. One brother has a weak stomach, and was troubled in much the same way as the patient is when at the same age. He has four sisters, all healthy.

The patient was perfectly well up to the age of fourteen years He had no diseases of childhood He went away to school at this age, and soon began to have occasional attacks of acute pain in the stomach, with headaches and constipation. While at school he was very careful in his habits, but in the summers he used alcohol and tobacco to excess. He had never vomited. The symptoms gradually grew worse until he came under observation, in October, 1899. During the summer he had been washing out his own stomach once or twice a week, with considerable relief of his symptoms. He then had occasional pain in the epigastrium, eructations of gas and bitter material after meals, constipation, headache, and inability to concentrate himself upon his studies. He has always been a rapid eater. He had some muscular insufficiency of his eyes for several years, and up to a year ago—when his eyesight was corrected by glasses—suffered much from granular lids and could not use his eyes at night.

The examination showed that his heart and lungs were healthy, and that the kidneys, liver, and spleen were in their normal positions. No fluid was found in the fasting stomach before breakfast. The inflow was very easy and the outflow difficult. The stomach contents were removed sixty minutes after an Ewald test breakfast, and 70 c.c. were recovered. Hydrochloric acid was present, lactic acid absent, butyric

acid absent. The total acidity was 60. Inflation showed that there was considerable gastroptosis. The pylorus was in the mid-clavicular line, at the costal margin. The lesser curvature was half-way between the ensiform and umbilicus. The greater curvature was three finger-breadths below the umbilicus, showing that there was considerable

FIG. 2.



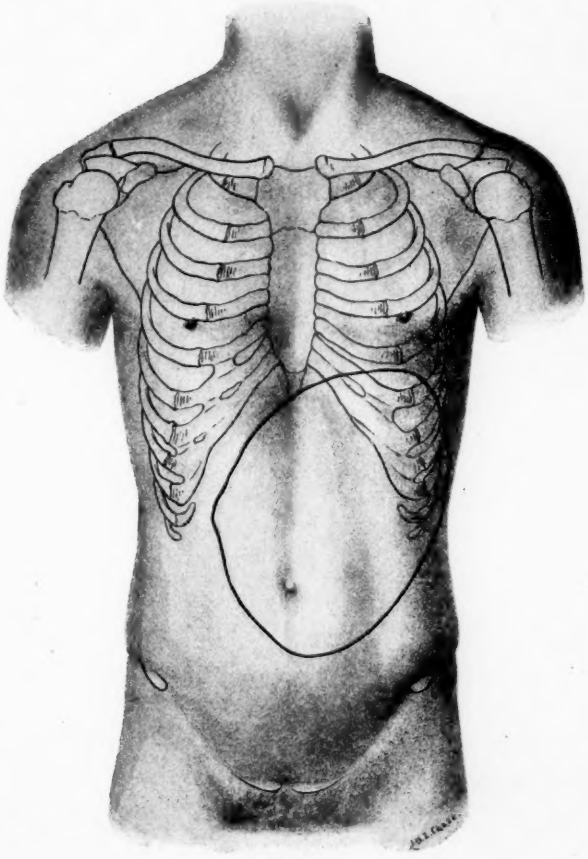
By inflation.

dilatation as well as atony (Fig. 2). The patient could not take more than 1000 c.c. of water in his stomach without discomfort.

CASE VI. (J. H. M.).—Male, aged twenty-two years; law student. His mother is neurasthenic, but with this exception the family history is good. No bad habits; no smoking or stimulants. Had typhoid

fever in 1895, and since then had had some bowel disturbance, which increased in 1898 to an extreme degree. The symptoms began with constipation, which soon turned into chronic diarrhœa. During this time he had several large movements a day, containing mucus and blood. When first seen, in February, 1899, he had one stool a day,

FIG. 3.



By inflation.

which contained at first fecal matter, and then became very loose. Ever since the attack of typhoid fever quoted above he suffered with eructations of gas and fluid, beginning some little time after meals, and with fulness in the stomach after eating. He was very nervous, easily exhausted, worn and emaciated, and had lost considerable weight. He

was unable to study. He had a marked splashing sound, and tympany extended to the right of the median line.

The stomach-tube brought away considerable undigested and fermented food, indicating considerable gastric atony. Inflation showed that the stomach was much dilated. The greater curvature was three finger-breadths below the umbilicus, and the lesser curvature at the ensiform cartilage. There was consequently dilatation with no gastroptosis (Fig. 3).

Case VII. (J. H. M.).—Male, aged nineteen years; medical student. His family history is very good. The patient has always been healthy, except that he has been somewhat troubled with constipation and flatulency at various times. He has led an active life, a good deal of the time in the open air. He has smoked considerably during the past year. There was no trouble with his eyes.

The present illness began with flatulency, accompanied by pain and tenderness around the umbilicus. The pain gradually spread over the whole abdomen. It seemed to be of a nervous character, becoming much more severe during excitement of any kind. There was no nausea or vomiting at any time. From August, 1898, to October, 1898, he lost twenty-two pounds, and became much weakened.

The stomach-tube brought away a considerable amount of fermented material from the stomach. Upon washing out the stomach two hours after a test breakfast consisting of meat and toast, aspiration brought away much undigested food and a considerable amount of fluid. In washing out the stomach the inflow was very rapid, causing an eddy in the funnel, but it was extremely hard to withdraw the gastric contents or to siphon away the washage water. Inflation showed considerable dilatation. The greater curvature extended two finger-breadths below the umbilicus, and the cardiac end extended up to the fifth rib on the anterior axillary line, and the lesser curvature was on a level with the ensiform.

Case VIII. (J. H. M.)—Male, aged twenty-four years; college student; white; single. His mother has asthma and hay fever, but otherwise the family history is very good. The patient smoked to excess, and used beer and probably other stimulants at least injudiciously. He did not overwork. He had been healthy all his life, with the exception of an attack of chronic malaria three years ago, which lasted for one year. For two years he had had gastric disturbance, fulness after eating, eructation of gas and bitter material. His thirst had been somewhat excessive, and the urine had been scanty and of high color.

The stomach-tube was passed forty minutes after a small test breakfast, and 25 c.c. were recovered. A large amount of bread and fluid came with the washing. The odor was slightly sour; total acidity 40; free hydrochloric acid was present. The total hydrochloric acid was 8. There was no lactic or butyric acid. Peptones and starches were present, and a trace of bile. The water ran in rapidly and siphoned out with difficulty. The greater curvature was three finger-breadths below the umbilicus, and the pylorus was two-thirds of the way to the right mid-clavicular line. The lesser curvature crossed the ensiform. There was no gastroptosis. The patient suffered much from a mental inactivity and weakness.

When the stomach-tube was passed he had a clonic spasm of the extensor muscles of the arms and legs, with external rotation. Trous-

seau's sign was not obtained, and there was no response when stimulating the facial nerve.

Diagnosis. In establishing a diagnosis of motor insufficiency the following signs are of most value:

1. The presence of undigested food and fluid in the stomach fasting over night. The stomach is never entirely empty, as was the case in all but one of our series. This symptom is recognized by all authors to denote a decided lack of motor power. The rule laid down by Riegel in this connection is that when food and fluids are found seven hours after a meal the stomach is lacking in motor power.

2. The manner of inflow and outflow of water when the stomach-tube is used is characteristic. The water flows in with great ease, causing a whirlpool in the funnel, and was removed with great difficulty. The rapidity with which the water enters and the difficulty with which the contents of the stomach are removed appear to us to be an evidence of weakness in the gastric muscle. In enlargement of the stomach due to obstruction of the pylorus the gastric contents can be expressed with more or less ease. Water flows in slowly and flows out with great readiness. This is due to the hypertrophy of the muscle-wall of the stomach caused by its efforts to overcome an obstruction at the pylorus. On the other hand, if the walls of the stomach are relaxed from inherent weakness, then water flows in readily, the contents cannot be expressed, and it is difficult to empty the stomach entirely by siphonage.

3. Inspection of the abdomen—a point upon which Osler and Allbutt lay much stress—has been, in our experience, a sign of somewhat negative value in cases of dilatation from atony. It is possible that they refer more especially to cases of dilatation from obstruction when they speak of marked prominence in the right upper quadrant of the abdomen. All of our series, in which there was no gastroptosis, showed a slight protrusion in this region, and one case—Case V., in which there was considerable gastroptosis—showed a slight flattening in the epigastrium, with some protrusion at the level of the umbilicus.

4. In none of our series were peristaltic waves seen through the abdominal wall, nor could they be invoked by stimulation. This is another point in favor of the view that the dilatation was due to weakness of the gastric muscle. In cases in which the stomach enlarges by reason of obstruction in the pyloric end peristaltic movements are very frequently observed. This is explained by considering the fact that the gastric muscle in cases of dilatation from obstruction is much stronger and more active than in cases of dilatation from atony.

5. Riegel and Allbutt lay stress upon the fact that in atonic conditions of the stomach-wall palpation may throw considerable light upon the condition of the stomach. The walls of the stomach in such cases, as felt through the abdominal wall, are relaxed and flabby. To obtain

this sign, however, the abdominal parietes must be exceedingly thin and relaxed—a condition that was not present in any of our cases, and, consequently, we could not consider it of much value.

6. Evidences of fermentative processes in the stomach were almost invariably present. These were eructations of gas or bitter material, muscular weakness, lack of mental activity, and other signs of auto-intoxication. There were usually insomnia, inability to work, and diminished power of concentration. Some muscular pain and twitching were present in all of our cases. Case VIII. had an attack of muscular spasm that might be considered tetanoid, although the symptoms were not entirely characteristic. It always occurred during lavage. In other cases no symptoms of tetany were observed, as evidenced by our failure to obtain any disturbance in stimulating the facial nerve or to get Trousseau's sign.

7. The urine was almost always concentrated and small in amount. The fact that water is not absorbed by the stomach-wall would seem to make the scantiness of the urinary secretion a sign of value in making the diagnosis of motor insufficiency, and is so recognized by the principal authorities.

In all of our cases the appetite was good. Thirst was moderate, and the bowels usually constipated.

In determining the size and position of the stomach we consider inflation with air through the stomach-tube by means of an ordinary Davidson syringe to be the easiest and most reliable method. While we recognize the value of Dehio's procedure of causing the patient to drink measured quantities of water, and percussing the lower border of the stomach before and after, we think this method has the serious objection that by its use the position of the lesser curvature cannot be definitely determined. Moreover, its only advantage in the determination of the position of the greater curvature is that it does away with the necessity of passing the stomach-tube.

The amount of water that can be passed into the stomach may also be looked upon as a sign of value in determining the existence of dilatation, but it cannot be considered absolutely reliable. The maximum capacity of a normal stomach, which is placed at 1500 c.c. by Ewald and 1680 c.c. by Ziemssen, has been shown by Pepper and Stengel to be in some cases as high as 2600 c.c. The mental attitude of the patient seems to be a considerable factor in determining the capacity of the stomach by this method, and some will complain of fulness before the amount of water poured through the tube reaches a quantity at all commensurate with the degree of dilatation that inflation with air shows to be present. It must be considered, too, that the stomach, about to be filled with water, may contain considerable gas, the result of fermentation, which cannot find an outlet along the stomach-tube or

through the pylorus. This may cause considerable distention before the water enters, and, naturally, the amount of water required to produce a sense of fulness would be much too small to indicate correctly the capacity of the stomach. Cases II., III., IV., VI., VII., and VIII. held at different times quantities of water varying from two to four litres, and this must be considered an evidence of increased capacity. Case V., on the other hand, could take but 1000 c.c. without discomfort, although there seemed to be some dilatation, as shown by inflation, and the signs of motor insufficiency were well marked.

The gastric secretion was not disturbed to a marked degree in any of our cases. In none was there hyperacidity, and free hydrochloric acid was found in all at some time while under observation. Lactic acid was present occasionally in Case II., but hydrochloric acid was usually present as well.

One of the most comprehensive classifications of the varieties of this condition is that given by Hemmeter, based upon the work of Riegel and Boas. It is as follows: First, simple gastric atony or motor insufficiency without dilatation. Second, atonic dilatation due to relaxation of the gastric walls without pyloric stenosis. Third, secondary dilatation due to pyloric stenosis. But to classify the cases of dilatation into those of dilatation from atony, and dilatation from obstruction, as indicated by Pepper and Stengel, seems all-sufficient. From the study of the general symptoms given above, and of the evidence of the size and position of the stomach obtained by inflation, we consider that all of our cases are to be placed under the second heading of Hemmeter's classification or under the first heading of Pepper and Stengel. It is to be remembered that in Case V. there was also some gastroptosis.

In several cases the occasional absence of hydrochloric acid appears to indicate a considerable amount of chronic gastritis that probably antedated the motor insufficiency. The relations of the two conditions will be considered under the heading of etiology.

The differential diagnosis does not seem to be difficult. It is necessary to exclude pyloric obstruction from malignant disease, from scar formation due to ulcer, or from spasmodic contraction and duodenal stenosis. The grounds upon which this diagnosis was based are as follows: 1. The absence of a history of gastric ulcer and hemorrhage from the stomach. 2. The age of all of our cases, being too young for cancer. 3. The absence of any sign of peristaltic action in the stomach-wall as seen or felt through the abdominal walls, denoting a weakness of the muscle and not the usual hypertrophy seen in the early stages of pyloric obstruction. 4. The rapid inflow of the water through the stomach-tube, and the difficulty of removal of the stomach-contents, showing lack of power in the stomach-wall. 5. The absence of any sign of tumor. 6. The absence of bile in the stomach

contents, indicating duodenal stenosis. 7. The presence of hydrochloric acid in all the cases at some period of observation.

The question of the existence of congenitally large stomach, or megalogastria, must also be considered. However, the symptoms of motor insufficiency were so decided that it must be assumed that the enlargement in every case was due to dilatation.

ETIOLOGY. In his article in Nothnagel's *System*, Riegel says: "The stomach weakness may be only a part of the manifestation of a general lack of strength, be it congenital or acquired. We see under the influence of severe exhaustion the evidences sometimes of irritation and sometimes of paralysis of the most varying nerve plexuses. There is no wonder, then, that under the same conditions the appetite may suddenly fail in some cases, while in others the peristalsis may be increased, or, in still others, atony and paralysis of the stomach may occur." It is seen that Riegel recognizes a variety of atonic motor insufficiency due to severe bodily and mental strain without a precedent history of chronic gastritis. He calls attention to the fact that the tendency to weakness of the stomach may be congenital, either on account of a similar localized weakness of the parents, or on account of an hereditary general bodily lack of resistance. Most authorities state that a chronic gastritis is a very frequent cause for motor insufficiency in dilatation. The vicious circle is established from lack of nutrition due to the gastritis, and the muscular layers of the stomach are affected either by an extension of the chronic inflammation from the mucous membrane of the stomach or as a result of general impairment of the bodily strength. Clifford Allbutt says in this connection: "From my own experience I should find it difficult to say whether catarrh or primary atony of the stomach were the commonest cause of dilatation of the stomach not dependent on pyloric stenosis or constitutional disease. A gastric catarrh, by reducing the value of the gastric secretion and promoting fermentation, is a potent means of setting up dilatation."

The etiology of each case will be considered in outline: Case I. The father was dyspeptic and the mother decidedly neurotic and gouty, and it is possible that the patient inherited the so-called tendency to a weak stomach; but, at all events, it is likely that his resistance was not great enough to stand the confined life and mental strain of a trying course of study. In Case II. there does not seem to be any predisposing cause, such as heredity, to explain the condition. It is probable that badly selected food and hard work before he entered the University produced a chronic gastritis, which led to dilatation from atony, and that the strain of hard study aggravated the condition. Case III. much resembled Case II. The effort of working his way through college and the medical school produced a degree of nervous exhaustion that would seem to be responsible for his condition. Case V. would

appear to be an instance of a congenital weakness of the tissues supporting the stomach, which produced a considerable degree of gastroptosis. It is hard to say whether this gastric atony preceded or followed the displacement of the stomach. The early occurrence of this condition would indicate some congenital factor in its causation. It is possible that the gastroptosis played some part in the production of the dilatation, whether from traction and kinking of the duodenum or from some other cause. His occasional excesses in tobacco and alcohol probably aggravated the condition. In Cases IV., V., VI., and VIII. there was a history of excessive use of tobacco and of the at least injudicious use of other stimulants. These conditions combined probably caused a chronic gastritis, which resulted in considerable atrophy of the muscular layers and dilatation. Bouveret states that excessive smoking may in itself cause gastric insufficiency. Riegel, in commenting upon this statement, says that it is probable that the direct results of such narcotics is gastritis, which is followed by atony of the stomach-walls. Case VII. is probably one of dilatation from atony occurring during the course of or in the convalescence of an acute illness. The symptoms of intestinal and gastric disturbance can be traced directly to the attack of typhoid fever that occurred two years before he came under observation. It is well known that the strain of such an illness is an important factor in the causation of weakness in the gastric muscle.

It must have been observed in a review of the series of cases that the eyes were at fault in all but Case VII. It is an unsettled question whether such a condition is one of cause or effect, or whether the two are simply combined symptoms of trouble arising from a common cause in the nervous symptom. It is our experience that correction of eyesight by glasses appears to have a beneficial effect.

A boarding-house table, leading, as too many of them do, to careless habits and to great haste in eating, and in some instances furnishing a too great proportion of fried and fatty foods, renders it extremely difficult to treat such cases of motor insufficiency in students, and is probably a factor in the causation of the condition.

Our conclusions may be briefly given: 1. The symptoms upon which most reliance can be placed in determining the presence of gastric motor insufficiency are: (*a*) The presence of fluid and food in the stomach fasting over night; (*b*) the ready entrance of fluid through the tube and difficulty in the return flow; (*c*) the absence of visible gastric peristalsis; (*d*) evidences of fermentation and intoxication by the products thereof; (*e*) thirst, and (*f*) scanty and concentrated urine.

2. In determining the position and size of the stomach, by far the most certain method has been inflation by air through the stomach-tube; auscultatory percussion, Dehio's method, and determining the

capacity of the stomach by the amount of water required to produce a sense of fulness, while signs of value may lead to error.

3. It may be inferred from the somewhat small number of cases just reported that the condition is not uncommon in students. An analysis of the etiological factors is as follows: (*a*) Myasthenia caused by chronic gastritis from the abuse of alcohol and tobacco, four cases; (*b*) myasthenia from deficient innervation, two cases; (*c*) myasthenia, probably of congenital origin, one case; (*d*) myasthenia occurring in the course of acute disease, one case.

THE SURGICAL TREATMENT OF ACUTE PUERPERAL SEPSIS, WITH SPECIAL REFERENCE TO HYSTERECTOMY.[1]

By Hiram N. Vineberg, M.D.,
of New York.

It is not without considerable diffidence that I bring the subject of the surgical treatment of acute puerperal sepsis before you, feeling only too keenly that its gravity and importance call for some exponent who has had a more extensive and a longer experience than I have had. But my work in this direction has met with such strong opposition, and has been subjected to so much unfavorable criticism, open and covert, and my attitude has so often been misunderstood, that I am desirous of an opportunity to define, as clearly as it is possible within the scope of this communication, the views that have guided me in my work and to elicit a discussion of them by this representative body of men.

The first point to determine in the discussion of this subject is, What clinically constitutes acute puerperal sepsis?

It is held by some that the term "acute" should be applied only to those cases that set in with severe symptoms during the first three days of the puerperium, and which usually terminate fatally any time between the fifth and the tenth day. Cases protracted beyond this period they would designate as "chronic." The importance of this definition becomes manifest when the question of radical surgical intervention is mooted. The adherents of this definition argue that the first class of cases end fatally no matter whether they are operated upon or not. In fact, according to one of the critics, all that a radical operation can do in these cases is to hasten the inevitable fatal termination.

The second class of cases, they say, run a "chronic course;" they usually get well of themselves, or if an operation is indicated it can be indefinitely delayed, and comes under the heading of those that are done for pelvic affections of a non-puerperal origin.

[1] Read before the American Gynecological Society, May, 1899.

It seems to me that such a definition is untenable and is unwarranted by clinical facts.

A truer definition, to my mind, of "acute" puerperal sepsis would be an infection that takes place either shortly before, during, or immediately after labor—that manifests itself by symptoms during the first week of the puerperium, and in which the symptoms persist continuously, with variable severity, until the disease ends in death, in a cure, or passes into a chronic state.

Supposing a woman at a non-puerperal period should acquire a streptococcus or staphylococcus infection of the pelvic organs and run a continuous fever curve say from 101° to 104° or 105°, and a pulse from 100 to 130 or 160, would we say she had an "acute" disease or a "chronic" one? I am sure there would be but one opinion regarding the "acute" character of the case. We would consider the case "chronic" only after the fever and rapid pulse had subsided and the woman still presented a lesion of the pelvic viscera. Why, therefore, should we apply a different standard to an infection acquired at the puerperal period?

It is not my desire, however, to split hairs on the subject of definition. The practical question, after all, is to determine whether *all* fatal cases of acute puerperal sepsis run their course within a given period (five to ten days).

One's experience and a superficial glance at the literature on the subject ought to convince one that such is far from being the case.

The following are a few data collected at random from the literature for the past few years:

Gaertner[1] reports a case in which death occurred on the seventeenth day of the puerperium.

Bayard Holmes,[2] one case in the seventh week.

Hensoldt,[3] one case on the fifteenth day; one case on the twenty-third day; one case on the sixteenth day; one case on the twenty-sixth day (from fibro-purulent peritonitis).

Schwarz,[4] one case on the twelfth day (from purulent peritonitis); one case on the nineteenth day.

Hünermann,[5] one case on the fifty-fifth day; one case on the seventeenth day; one case on the eleventh day (from peritonitis); one case on the twenty-sixth day; one case on the eighteenth day; one case on the fortieth day (in this case had fever on the fourth day, chill on the seventh day, on which day some placental residue was found in the uterus and removed); one case on the eleventh day (peritonitis); one case on the thirty-eighth day; one case on the fourteenth day.

[1] Archiv für Gynäkologie, Band xliii. p. 252.
[2] Journal of Medical Association, 1895, No. 23, 1895—a very valuable and instructive paper.
[3] Charité Annalen, 1890-1891. [4] Ibid., 1891-1892. [5] Ibid., 1892-1893.

Hockstetter,[1] one case on the thirty-sixth day; one case on the twenty-first day (from peritonitis); one case on the fourteenth day (chill and high fever on the ninth day, only slight fever before; removed fragment of decomposing placenta on this day); one case on the eleventh day (from purulent peritonitis).

Hockstetter,[2] one case on the twelfth day; one case on the twenty-fifth day.

Klauer,[3] one case on the twenty-ninth day; one case on the forty-third day.

Klauer,[4] one case on the twelfth day (from peritonitis); one case on the seventeenth day; one case on the twenty-second day (from peritonitis).

Velde and Volkmann,[5] one case on the eleventh day; one case on the twenty-fourth day (from peritonitis); one case on the twenty-seventh day.

Widal,[6] one case on the eighteenth day.

P. Ernst,[7] one case on the seventeenth day.

Hoff,[8] one case on the twelfth day.

Brieger,[9] one case on the eleventh day; one case on the twenty-second day (chill and fever on the tenth and eleventh days).

Cannon,[10] one case on the twentieth day; one case on the twenty-eighth day.

A. de Pourtales,[11] one case on the twenty-eighth day (from suppurative peritonitis); one case on the twenty-fourth day.

There are accordingly thirty-eight cases in which death occurred from the eleventh to the fifty-fifth day, or on an average of twenty-three days. Among these there are ten cases of septic peritonitis (of all puerperal lesions the most rapidly fatal) in which the fatal termination occurred from the eleventh to the twenty-eighth day.

Another argument brought forward against radical intervention is that so long as there is no general or constitutional infection the patient will get well without an operation, and once general infection has occurred it is worse than useless to remove the uterus and adnexa with the hope of arresting it. You might as well think, it is said, of doing this by cutting off the patient's head. An obvious reply to this is that intervention is to be instituted before the local infection has become universal. But what warrant is there for the assertion that when the infection has reached the blood current, or, in other words, when systemic infection has occurred, the case is hopeless. Has the human economy no powers

[1] Charité Annalen, 1892–1893.
[2] Ibid., 1893–1894.
[3] Ibid., 1894–1895.
[4] Ibid., 1895–1896.
[5] Ibid., 1896–1897.
[6] Thèse, Paris, 1889.
[7] Virchow's Archiv, Band cxxxiii.
[8] Dissertation, Strasburg, 1890.
[9] Charité Annalen, 1888.
[10] Deutsche Zeitschrift für Chirurgie, 1893.
[11] Archiv für Gynäkologie, Band lvii., Heft 1.

of resistance to bacterial invasion?[1] Daily clinical experience teaches us that fortunately it has to a very great extent; but, of course, there is a limit to this power, and this circumstance forms one of the strongest arguments in favor of timely surgical intervention. Cut away a gangrenous appendix, and the patient may get well, though the poison has pretty well surcharged his system; leave the gangrenous mass within his abdomen, and the poison in a short time will kill him. Remove a uterus, the walls of which are a breeding-place for bacteria, and the patient may get well, though she shows all the clinical and bacteriological signs of systemic infection; fail to do this, and it is more than likely that the reinforcements of the enemy from the reserve army in the uterus will in time destroy everything before it.

When called to a case of acute puerperal infection it is my custom to make a thorough examination of the perineum, vagina, and cervix for any wounded surface. If any is found it is inspected very carefully. The uterus, adnexa, and pelvic tissues are subjected to a thorough bimanual examination. The result of such an exploration, together with the prior history and the present condition of the pulse, temperature, and tongue, are carefully studied, with the view, if possible, of ascertaining the point of entrance of the septic material. If an ugly-looking wound is found at the perineum, or in the posterior vaginal wall, or high up in the vault, extending on either side from a deep tear in the cervix, and the uterus is found fairly well contracted and corresponding in size to the normal one at that period of the puerperium, the uterine cavity is religiously left undisturbed, I then direct my whole attention to the treatment of the infected wounded area. It is not necessary to enter into any details as to the procedures followed any further than to say that the same principles of drainage and frequent irrigation with some antiseptic solution are observed as one would in a septic wound elsewhere.

These irrigations should be carried out by the physician himself, two or three times in the twenty-four hours. In the intervals of the doctor's visits the irrigation may be entrusted to an intelligent and careful nurse.

Of course, it goes without saying that the general treatment of the patient is not to be neglected, but upon this point we are all pretty well in accord.

Cases are sometimes met with in which there may be some doubt whether a double infection does not exist—one of the vaginal canal and one higher up, in the interior of the uterus. In these instances the patient is anæsthetized and the uterine cavity is thoroughly explored, either with the finger or the curette, or with both, the greatest care

[1] Cases of puerperal sepsis have been reported in which the pathogenic germs were found in the blood and the patients recovered, showing that systemic infection is not necessarily fatal. (F. Gärtner's Centralblatt für Gynäkologie, 1891, No. 40.)

being taken not to carry any of the infection from the vaginal wound into the uterus. If no evidence of uterine involvement be found the uterine cavity does not receive any further attention; but if there are positive signs of such involvement in the existence of a large, flabby uterus and placental and decidual residue, or in débris of a fetid odor, the uterus is subjected to a thorough curettage and provision made for efficient drainage. This is best carried out by introducing a couple of large rubber catheters and leaving them *in situ*. In this manner the uterus can be frequently irrigated without disturbing the patient and without the fear of carrying up any infection from the vagina. The catheters should be removed once in every twenty-four hours, so as to cleanse them. With the aid of a bivalve speculum they can be reintroduced without coming into contact with the vaginal or perineal wounds.

A brief narration of the following case will demonstrate the practical execution of the above outlined procedure:

Case I.—I was called to a young primipara, who, nine hours before, had been delivered, by the vigorous and prolonged use of the forceps, of a child in an occipito-posterior position. The woman, at the time of the visit, was in profound shock, with a very small and rapid pulse and a temperature of 101°. I was enabled to make only a very superficial examination, which disclosed a very deep tear, extending from the left side of the cervix through the vaginal tissues down to the pelvic wall, running downward along the whole length of the vagina, through the rectal sphincter, and involving about two inches of the rectum. The wound had an ugly, unhealthy appearance. Stimulants were given to combat the shock, and twenty-four hours later, when the patient had rallied and there were still signs of marked sepsis, she was anæsthetized and subjected to a searching examination. First, the vaginal wound was thoroughly cleansed and completely covered with iodoform gauze. Before proceeding to the next step I vigorously disinfected my hands. The cervix was then exposed and seized with a vulsellum, and the whole interior of the uterus was now gone over with a large curette. Nothing being found, the uterus was merely irrigated with a boric acid solution and afterward left alone, excepting that it was examined daily through the abdominal wall to note if involution was progressing satisfactorily. Owing to the obesity of the patient and to the voluminous vagina, it was difficult to obtain satisfactory drainage from the upper part of the wound, where there was a deep wound leading down to the pelvic wall. The edges of the wound were kept apart by strips of iodoform gauze, which were frequently changed, and the whole wound was irrigated with various antiseptic solutions. For two weeks the patient's condition was critical in the extreme, the temperature ranging from 102° to 105° and the pulse from 120 to 130. At the end of this time the wound began to assume a less unhealthy appearance, and the temperature and pulse gradually decreased. It took about two weeks longer before the wound began to show healthy granulations and before the temperature and pulse became normal. There were no complications, no pelvic exudate, no phlegmasia dolens, the uterus involuted satisfac-

torily, the patient making a complete recovery. Three months later I repaired the tear of the cervix and of the rectum and sphincter, obtaining an excellent result.

There still seems to be a lack of unanimity among the profession as to the propriety of curetting the uterus when it is the seat of puerperal infection. All agree as to the advisability of removing any placental or decidual tissue or organized blood-clots that the uterus may contain when there are symptoms of sepsis, but the method of removal is the object of considerable diversity of opinion. Some hold that nothing but the finger should be employed. They apparently forget that just in this class of cases the manifestations of sepsis may be delayed as late as the eighth day, or even later, when the cervix may be fairly well closed, and when its forcible dilatation to the extent of being able to introduce the finger may not be feasible or be attended with great risk of tearing into the uterus.

The latter accident has happened time and again in the hands of experts. The opponents of the use of the curette base their objection upon the fear of breaking down with it the so-called "granulation zone," first described by Bumm, which acts as a barrier to the bacteria from penetrating deeper into the uterine tissues and thus spreading the infection. Others, again, say the curette may be used, but care should be taken not to break down this barrier that nature has provided. Of course, such advice is absurd. How is it possible to curette the endometrium with the sense of touch, or even with the aid of sight, and avoid a structure in it that is visible only with a high-power microscope? But the advice is in keeping with a great deal more that has been written on this subject. The fact is, as so frequently happens, that Bumm's observations have been misinterpreted. He found this zone fully developed only in the milder forms of uterine infection in the products obtained by curetting the uterus. These patients all recovered, and presumably they were bettered by the curetting, or at all events they were not injured thereby. In the severe and fatal cases of uterine sepsis the granulation zone did not exist at all or was only very poorly developed. The bacteria were found penetrating the whole thickness of the uterine wall and onto the peritoneum. The patients were not curetted, but yet they died.

As I stated on a former occasion,[1] "If Bumm's observations were to guide us in our clinical work we would refrain from curetting the *mild* cases of uterine sepsis, while in the severe forms they would constitute no contraindication, for we could not destroy that which did not exist."

In any given case, therefore, when by exclusion or by any other means we reach the diagnosis that the site of infection is within the

[1] Practice of Obstetrics by American Authors (Lea Brothers, 1899), p. 350.

uterus, it should, in my opinion, be subjected to a thorough curetting, whether it be with the finger or the curette or with a combination of both. In my opinion, the sharp curette in expert hands is less likely to do harm than a dull instrument or even than the finger roughly employed. If the curette removes considerable débris or thickened mucosa, and the temperature and pulse do not promptly fall to the normal, it is my custom to employ uterine irrigation with some antiseptic solution other than bichloride of mercury, which I deem a very dangerous agent to use.

The irrigations may be carried out with two rubber catheters remaining *in situ*, as already described.

The majority of cases of uterine sepsis, even of the more serious type (not the so-called cases of sapræmia), will yield to this treatment if faithfully carried out. Within the past three years I have treated fifteen cases of pronounced uterine infection in this manner, and they all recovered.

But occasionally a case will be met with which does not respond to this plan of procedure. Despite the treatment, the patient grows more profoundly septic, as manifested by the pulse and other well-known signs, or there are evidences that the general peritoneum is becoming involved, or, in other words, to an experienced observer it is evident that the patient is not holding her own, she is losing ground rapidly, then, in my opinion, something of a more radical nature should be resorted to. What this "something" should be must vary with each individual case, but to be successful with it one ought not to wait until the patient is moribund.

In any case of uterine sepsis, therefore, if the above measures fail to bring about a satisfactory result, and no exudate can be detected in the pelvis to account for the increase of the septic manifestations, I deem it a justifiable and proper course to open the abdomen and be guided in one's further actions by the condition revealed. In most of these cases it will be found necessary to perform total hysterectomy.

Every conscientious operator will recognize the difficulties in determining the indications for so radical a procedure.

In a former paper[1] I stated that un ler the above conditions, if the pulse goes above 130, grows weak and small, hysterectomy is indicated. I am aware that such a rule is somewhat arbitrary, and I have myself not always adhered to it. There are a great many other things which must be taken into consideration, and which are difficult to describe, such as the general course the disease has run, the general appearance of the patient, the condition of the tongue, the character of the pulse, and so on.

It will be noted that in deciding upon my indications I seek no aid from

[1] New York Medical Journal, April 2, 1898.

a bacteriological examination of the interior of the uterus. My reason for ignoring such aid lies in the circumstance that it is extremely unreliable and unsatisfactory, even in the hands of expert bacteriologists. While I am willing to accept theoretically all bacteriology teaches us on the subject of puerperal sepsis from a practical stand-point, I heartily agree with Koblanck[1] when he says: "As a result of my own investigations and from a study of the literature I would assert that the bacteriological findings (in puerperal sepsis) can be used for our clinical purposes only with the greatest caution."

If it were necessary a great many other authorities could be quoted who found streptococci in the vaginal and uterine discharges of puerperal sepsis of a very mild form. Further, the finding of the streptococcus in the uterine discharge does not necessarily argue that the case is serious and beyond surgical relief. Bumm[2] found the streptococci in the scrapings obtained by curettage in the cases of septic endometritis already referred to, and the patients all recovered. Döderlein[3] examined twenty puerpera with transient fever, and found streptococci[4] in the lochia in two cases. On the other hand, it has been positively shown that various other micro-organisms (staphylococcus pyogenes aureus,[5] bacteria coli communis,[6] bacillus aërogenes capsulatus,[7] gonococcus,[8] and an undescribed bacillus[9]) are capable of producing very severe and fatal forms of puerperal sepsis.

It will be proper now to narrate briefly the history of the cases in which the above line of action was carried out, following each case with a few comments, with the view of bringing out more prominently the points of discussion on the subject of hysterectomy for acute puerperal sepsis.

CASE II. (reported in full in the *New York Medical Journal*, April 2, 1898).—A young primipara had a normal and easy labor on May 31, 1897. On the sixth day of the puerperium had a severe chill, fever, and considerable abdominal pain. I saw her for the first time on June 8th (the ninth day of the puerperium); she then had a temperature of 103° (oral) and a pulse of 120, which was soft and compressible. There was no uterine discharge nor any fetor. The uterus corresponded in size to the gravid organ at the tenth week, and was not sensitive to pressure. The cervix was fairly well closed. The abdomen was flaccid, the adnexa apparently normal, and the parametria free from any exudate. The labia majora were œdematous, transparent,

[1] Zeitschrift f. Geb. und Gyn., Band xl., Heft 1, p. 85.
[2] Archiv für Gynäkologie, Band xl.
[3] Archiv für Gynäkologie, Band xxxi.
[4] It is recognized that there are different forms of streptococci with varying virulence, but with the most modern methods of investigation it has not yet been possible to differentiate them (Koblanck).
[5] Stünckmann-Karger. Berlin, 1898.
[6] Krönig and others.
[7] Ernst, Dobbin and others.
[8] Krönig: Bacteriologie des weiblichen Genital Kanals. Leipzig, 1897.
[9] Birch-Hirschfeld.

and resembled a hydrocele of the testicle in appearance. No wound of the perineum or of the vagina. I dilated the uterus gently and curetted with a sharp curette, removing considerable grayish-white fragments of tissue. Intra-uterine irrigations ordered, but the order was not carried out. Saw the patient again on June 11th. She had had several chills. She was apathetic, slightly delirious, temperature 103.5° (oral) and pulse 130. Slight distention of the abdomen and some tenderness over both iliac regions. The patient was now transported to St. Mark's Hospital. Intra-uterine douches were then regularly given, but the fluid for the most part returned clear. There was little or no uterine discharge, and despite cold sponging, free stimulation, and other approved methods of treatment for acute sepsis the patient steadily grew worse, so that on June 11th, at 6 P.M. (the twelfth day of the puerperium) her condition was as follows: Great apathy, delirium, temperature 105.5°, pulse 154, very small and compressible, abdomen considerably distended; deep pressure over the broad ligaments makes the patient cry out with pain. At 9 P.M. of the same day abdominal total hysterectomy.

I found the broad ligaments considerably thickened, œdematous, and of a pearly-white color. The peritoneum covering the uterus presented the same appearance. The adnexæ were apparently normal. The ligatures in the broad ligaments were applied as far out and as near the pelvic wall as possible. During the operation a couple of pints of saline solution were introduced subcutaneously. The patient left the operating-table with a pulse fully as good as that before the operation. She ran some temperature for three days following the operation, after that it gradually fell to the normal, and she made a good, though slow recovery. Three months later she was the picture of good health.

The removed uterus presented the following characteristics: Body and fundus moderately soft, lower segment of quite firm consistence, cervical canal tightly closed. Length, 15 centimetres (6 inches); width at fundus, 13 cm. (5½ inches); thickness of wall at fundus, 3 cm. (1⅛ inches). On cutting open the uterus the whole interior above the cervical canal was found to be covered with a dark, tenacious, slimy discharge, emitting a very fetid odor. Attached to the left horn and extending transversely was a portion of placental tissue, measuring 2 x 4 cm. Its free surface was rough and irregular and its attached surface organized and very firmly adherent to the uterine wall. So firm was this union that with the nail and finger it could not be peeled off.

My course of action in the case has been severely criticised. My critics asserted that had I used my finger instead of the curette I would have been able to detect and remove the placental tissue, and thus have avoided the necessity of a hysterectomy. A superficial glance at the bisected uterus might lend color to such a criticism, but a close study of the specimen and of the history of the case would soon convince an unbiased observer that it was both unfair and unwarranted. When I curetted the cervix was so tightly closed that to attempt to dilate it so that a finger could be introduced would undoubtedly lead to rupture of the uterus. Granting even that the finger could have been intro-

duced, it would need to have been of unusual length (over five inches) to reach the site of the placental attachment; then, again, the placental residue was so firmly attached to the uterine wall that I could not peel it off with my finger-nail even after the uterus was cut open. Further, still, assuming even that the placental residue had been removed at the curetting, what warrant is there for the assumption that the patient would have recovered without further surgical intervention? The condition found three days later on opening the abdomen should afford a strong negative reply to this.[1]

The spirit of unfavorable criticism blinded my critics to the true significance of the case and to the valuable lesson it teaches. We have always been told that the presence of placental tissue in the uterus manifests itself by hemorrhage and by fetid discharge. Here was a case in which neither of these signs existed. There were no fetid lochia nor discharge of any kind, and there had been no hemorrhages. It was by a process of exclusion that I had arrived at the opinion that the uterus was the source of the sepsis, but the finding of placental tissue on cutting it open was a great surprise to me, and constituted another object lesson at unlearning.

Case III. (reported also in the same number of the *New York Medical Journal*).—The patient was thirty-nine years of age and a primipara, in labor for three days, when the services of the New York Lying-in Hospital were obtained. High forceps were applied; very powerful traction was necessary, owing to a contracted pelvis, with a dead child as the result. The patient was said to be septic at the time of the delivery. Her symptoms ran a moderately mild course until the eighteenth day of the puerperium, when she had three severe chills. She now became desperately ill, and was refused admittance into the several hospitals to which the husband had applied. She was admitted into St. Mark's Hospital, January 3, 1898, at 10 A.M. (the twentieth day of the puerperium). I saw her an hour later. Her temperature was 103.5°; pulse 120, small, weak, and irregular; respirations 46; tongue dry and coated, abdomen moderately distended and exquisitely tender everywhere. There was no wound of the perineum or of the vagina; the cervix was deeply torn, but granulating nicely; the uterus was slightly larger than corresponded to the period of involution. Curettage under narcosis removed considerable decidual tissue and débris.

January 4th, 6 P.M. Abdomen much more distended. Temperature 103.6°, pulse 130, intermittent and very weak.

At 8 P.M. abdominal total hysterectomy. The parietal peritoneum was of a dirty grayish color, as was also that covering the intestines. There was some turbid fluid in the free peritoneal cavity. The operation was rather difficult, owing to the very great distention of the intestines. The abdominal cavity was flushed with sterile salt solution and the pelvic cavity loosely packed with iodoform gauze, the ends passing

[1] Cases are reported in which the placental residue was removed and the patients died. (Brieger's Charité Annalen, 1888, Band xii., and others.)

through the vaginal and abdominal wounds. The patient made a rapid and uneventful recovery.

The uterus at the time of removal was large, soft, and flabby; its cavity was covered with a dark-colored, tenacious discharge. The adnexæ were apparently normal.

This was a case of acute peritonitis from uterine infection, and, as frequently happens, the bacteria invading the peritoneum evidently passed through the uterine wall without producing any noticeable changes in it. I was subjected to criticism for this case also. It was stated that if I had merely flushed the abdominal cavity that the woman would in all probability have recovered without the sacrifice of her sexual organs. Had the circumstances in that individual case been different the comment would have been worthy of consideration; but here we had an old primipara (fortieth year) with a contracted pelvis, necessitating high forceps and such traction that a dead child is obtained. In addition to this, we have a badly torn cervix. What sense would there have been in the attempt to save the uterus in that instance? Under different conditions the essay might be worth considering; but as yet the data bearing on this point are not encouraging. All the cases recorded in the literature in which this procedure was followed have ended fatally.

Case IV.[1]—A primipara, aged twenty years, had been delivered by her physician with forceps on April 17, 1898. On April 19th her temperature was 102° F., and on the next day it was 104° F. He then used the dull curette without anæsthesia. As the temperature remained the same, he used the dull curette again twenty-four hours later. On April 26th the temperature reached 104° F. A second physician was called in consultation, who made use of the sharp curette and removed what he took to be considerable placental remains. No improvement followed this; on the contrary, the temperature indicated marked sepsis, varying from 101° F. to 105.5° F. in the twenty-four hours.

I saw the patient on May 1st at 8 A.M. (thirteen days after the confinement). She lay in an apathetic condition, with rather a dry and heavily coated tongue; the temperature was 101° F. (mouth), pulse 130, and of fairly good volume. The abdomen was flaccid and not sensitive. On bimanual examination the uterus was found large, flabby, and rather difficult to outline; the cervix was patulous, and the index finger readily passed into the uterine cavity, which was found quite empty. At one point in the fundus the uterine wall seemed very thin. Behind the uterus and toward the right side was an ill-defined, boggy mass, which could not be mapped out separately from the uterus. A peculiar feature noticed in this examination was the lack of sensitiveness in exploring the uterine cavity. The uterus seemed an inert mass. At 6 P.M. the condition became rather alarming. Temperature 106° F., pulse 140 to 150; mucous membrane of lips cyanotic; extremities cold; patient complaining of great weakness.

[1] Case and specimen presented at a meeting of the Obstetrical Section of the Academy of Medicine, May 26, 1898.

A transverse incision was now made in the posterior vaginal vault for the purpose of exploring the mass and of giving exit to any collection of pus it might contain. No anæsthesia was employed. The mass proved to be a portion of the flabby uterus, which had sagged down in Douglas' cul-de-sac, and had given rise to the impression of a separate tumor. The incision was packed with iodoform gauze, and various stimulants were applied to the patient. For the next forty-eight hours her condition remained about the same, the temperature varying from 102° to 106° F., pulse 130 to 150, but the heart's action was growing perceptibly weaker and the patient was becoming more apathetic. On May 3d she was transported to St. Mark's Hospital, and at 4 P.M. I performed abdominal hysterectomy. On the solicitation of a former house surgeon, and against my own inclination, I first made an attempt to extirpate the uterus *per vaginam*. The uterine tissues were so friable, however, that every traction instrument simply tore out, and I soon desisted from the attempt; but the patient lost more blood in this step than she did during the remainder of the procedure from above. During it the patient was given fully a quart of physiological saline solution under the skin. She withstood the operation fairly well. On the second day following she developed a septic pneumonia, which gradually spread over both lungs, and until lysis occurred, between the tenth and twelfth days, she virtually lay at death's door. From this on she gradually improved, but the convalescence was slow and tedious, being protracted by a submammary abscess caused by one of the subcutaneous saline infusions.

The removed uterus was soft and flabby, measuring 13 centimetres in length and 11 centimetres in width at the fundus. On the interior of the fundus was an area about the size of a silver dollar, from which all the muscular wall had been scraped away; nothing but the peritoneal covering was left at this point. The external surface of the uterus was studded with small abscesses, varying in size from a pea to an almond; most of these were quite superficial. The peritoneum covering one of these abscesses, which was situated on the anterior wall just below the uterine insertion of the right tube, and which was about the size of an almond, was very much thinned. In a very short time the thin peritoneal covering would have given way and a foudroyant septic peritonitis would have resulted from the escape of the pus into the free peritoneal cavity, in the event of the patient not having previously succumbed to the sepsis. Both tubes and ovaries were quite normal in appearance.

The most carping critic could find no fault with the procedure followed in the above case, nor could anyone gainsay the assertion that the operation saved the patient's life; and still the same principles and the same process of reasoning guided me in this instance as in the other two cases of hysterectomy. The indications based upon the clinical course of the cases were exactly similar. No one could have foretold that the uterus in this instance would be found riddled with small, subperitoneal abscesses. To my mind, the operation in the two other cases was just as much a life-saving procedure as in this case.

It may be of interest to narrate here two cases in which my advice of a hysterectomy was not followed, and in which the operation, in my opinion, would in all probability have saved the patient's lives.

CASE V.—A strong German woman, a multipara, had miscarried of twins about the fourth month, the day before I saw her, June 15, 1898. A midwife had been in attendance, who said she did not make a vaginal examination, as she found on her visit the twins and the placenta lying between the patient's thighs.

I found the patient with a moderately distended abdomen; the breathing rapid and shallow; the temperature 103° F.; the pulse 120, rather small and thready. On vaginal examination the cervix was found quite open, and I could feel placental tissue within the uterus. I at once subjected the woman to a thorough curettage under narcosis, using the finger and sharp curette, removing a large quantity of placental tissue.

At 9 A.M. on the next morning the patient seemed to be somewhat improved. She had passed flatus, she said she felt easier, but I was not satisfied with her condition. Her temperature was 104° F. (rectal), pulse varying from 120 to 130, weak and irregular. The abdomen was still considerably distended; altogether the patient did not show the improvement one expects after a thorough emptying of the uterus in sepsis following an abortion. I had made arrangements to have her transported to St. Mark's Hospital, but owing to the absence of ambulance service she was taken to another very prominent hospital in the city. I called there on the next day (June 17th) and made inquiries of the patient's condition from the house surgeon. He informed me that she was doing fairly well, "though she was running some temperature," and that there were no signs of peritonitis, as the patient was having loose bowels. He asked me what I would do in the case. I replied, if the improvement was not marked I would do a hysterectomy, as I had intended. This reply evoked an incredulous smile, and the remark that the attending surgeon thought the patient would get well without an operation.

I learned afterward that the patient died on the 20th (five days after I had last seen her), and that the autopsy was made by the coroner's physician.

All the knowledge I could obtain on polite inquiry from this high and scientific official was a very curt reply that there was septic peritonitis.

I wish to draw attention to the circumstance in this case that, although the sepsis was due to retained placental tissue, which was removed *in toto*, as it was feasible to explore the uterine cavity thoroughly with the finger, the patient died after the lapse of five days from septic peritonitis. This case has a marked bearing upon the comments made on Case II.

CASE VI.—On the night of April 23, 1899, I was called to see a young primipara who had been delivered forty-eight hours before with forceps by a careful physician trained in modern methods. He assured me he had taken every possible antiseptic and aseptic precaution. On the next day she had fever and severe abdominal pain, which persisted in spite of treatment. At my visit the temperature was 103° F., pulse varying from 120 to 130, and possessing the character suspicious of a commencing peritonitis. There was a slight tear in the perineum, which the doctor had sutured. The uterus was hard to out-

line, the abdomen was moderately distended and rather sensitive to pressure. An hour later, under narcosis, I explored the uterine cavity with the finger and curette and found it quite empty. The uterus was soft and flabby, and showed no tendency to contract. The exploration was followed by an intra-uterine irrigation. I removed the sutures in the perineum. The wound, which was not very healthy looking, was cauterized with pure carbolic acid.

I made a very grave prognosis and advised, if there were no marked improvement in the morning, to have the patient sent to the hospital for the purpose of performing a hysterectomy. For various reasons my advice was not followed. The patient died three days later. Her physician kindly furnished me with the following notes: "The patient reacted fairly well from the curettement (?) on Sunday night. Her temperature on the following morning was 103° F., pulse 118, respirations 28. Vomiting set in and continued up to her death. Tympanites and swelling of the abdomen continued to increase, despite the application of ice to the abdomen. Apart from the vomiting and diarrhœa, which set in also on Monday, her general condition was good. Her pulse never rose above 120 except shortly before dissolution, when it became very rapid and was soon lost altogether. On Wednesday she went into collapse, and died on that day. Consciousness remained up to the very last."

I have no doubt that the diarrhœa in the foregoing case misled the medical attendant, who could not understand why the bowels could act freely in the presence of a septic peritonitis. When I saw the case the whole clinical picture impressed me as that of a commencing septic peritonitis, which would probably run a rapidly fatal course, but which might be arrested by an early hysterectomy. The patient had in her favor youth, a robust constitution, and a pulse which still was of a fairly good quality. I am convinced that an early operation could save some of these highly virulent and rapidly fatal forms of septic peritonitis; but surgical intervention, to be successful, must be prompt in this class of cases, just as it must be prompt in gangrenous and perforating forms of appendicitis without limiting adhesions. It is especially in these cases that the setting of the indications for operation is attended with such difficulties, for one hesitates to resort at once to so radical a procedure as a hysterectomy, and yet a delay of some hours may turn the balance against success. It is to be hoped that the experience gained in the study and observation of the fulminant forms of appendicitis will be of aid to us in forming the indications for operation in the fulminant forms of puerperal septic peritonitis.[1]

CASE VII. *Septic endometritis followed by acute salpingo-oöphoritis; salpingo-oöphorectomy; recovery.* (Reported in the *Medical News*, March 25, 1899).—A primipara, aged twenty-three years, had a normal labor on

[1] A friend of mine, a colleague, no doubt owes the preservation of his life in an attack of appendicitis, first, to the high diagnostic skill of his medical adviser; and, secondly, to the surgeon sent for, who had the courage to operate six hours after the first onset of symptoms. The operation revealed a gangrenous appendix and a commencing general peritonitis.

October 22, 1898. On the third day of the puerperium she had fever (temperature 103° F., pulse 106). During the next three days the fever gradually subsided, so that on the sixth day the temperature was 99.8° F. and the pulse 96. On the eighth day she had a severe chill, her temperature went up to 104° F., her pulse to 120. I saw her at 9 P.M. The tongue was coated with a white fur, the abdomen was not distended nor sensitive to pressure; there was a moderate tear in the perineum, which was granulating normally. The cervix was fairly patulous, but there was no discharge, and consequently no fetid lochia. The attending physician had given an intra-uterine douche at 3 P.M., but nothing had been washed away. The uterus was large, rather soft, reaching nearly to the umbilicus, and lying toward the right side of the abdomen. A very thorough curettage under full narcosis was performed, and several fragments of tissue were removed from the posterior uterine wall, where the finger could feel several ridge-like elevations. By depressing the fundus with the hand over the abdomen the intra-uterine finger could readily explore the whole cavity, which failed to find anything but the rugosities already referred to. Frequent intra-uterine irrigations were afterward employed and washed away considerable muco-purulent discharge. The patient gradually improved, so that on November 7th (the fifteenth day of the puerperium) her highest temperature was 99.2° F. and pulse 102. On November 8th (the sixteenth day), without any appreciable reason, the temperature and pulse began to go up again, and the patient complained of severe pain in the right iliac region. Now, for the first time, one could feel an elongated mass, about the thickness of the thumb, beneath the very thin abdominal wall. It seemed fixed and was exquisitely tender. At 4 P.M. the temperature had risen to 104° F. and the pulse to 140. It seemed evident that the infection had passed into the right tube and set up an acute salpingitis. I decided, therefore, to open the abdomen without further delay and to be guided in my future action by the condition found. This was accordingly done an hour later. The uterus was about the normal size, of firm consistence, and presented no lesion upon its exterior. To the right of the uterus lay an ugly-looking mass, almost black in color, which on closer inspection proved to be the right tube and ovary matted together. The ovary was double the normal size, of a dark reddish color, œdematous, and covered with black, angry-looking exudates. The tube presented the same dark appearance, was the thickness of one's thumb, with the fimbriæ very much thickened and looking like a black mushroom. The infundibulo-pelvic ligament was considerably infiltrated and reddish in color. I tied off the ovarian vessels as close to the pelvic wall as possible, then rapidly excised the tube and ovary with the scissors, following the excision right into the horn of the uterus. The resulting wound was quickly closed with a looped continuous cat-gut suture. An opening was made through Douglas' cul-de-sac into the vagina, through which a strip of iodoform gauze was carried. Another strip of gauze was laid over the line of suture in the broad ligament and the end made to pass out at about the lower two-thirds of the abdominal incision. The abdominal wound above and below this point was closed in the usual way with tier sutures. The patient made a good recovery, with primary union of the abdominal wound, although for some time there was a free discharge of purulent matter from the vaginal and abdominal openings. At no time was there any evidence

of peritoneal irritation, the flatus being freely passed eighteen hours after the operation. Three months later the patient was in an excellent condition. Such of the pelvic organs as were not removed appeared healthy; the uterus was of normal size and in good position; there was no pelvic exudate, and the menses were regular.

The above case, to my mind, strikingly illustrates the value of prompt surgical intervention in properly selected cases. It was evident that the infective process had passed beyond the uterine cavity and was setting up an acute lesion in the right appendage. The severity of the symptoms attending the onset of this extension resembled that observed in a bad case of appendicitis, and on opening the abdomen the tube and ovary presented that same dark and angry appearance seen in an appendix that has become gangrenous.[1]

In these cases and in those in which hysterectomy is done for acute septic metritis I think it is a good plan to drain from above and below.

No matter how far out one applies his ligatures on the broad ligament, considerable of the infiltrated ligament is left behind. These in all likelihood will break down and suppurate. If no provision has been made for the exit of this broken-down material the patient will succumb to secondary sepsis.

My first case was almost lost because the drainage was interfered with during the first days following the operation. After free drainage had been established the temperature gradually fell to the normal.

I am aware that these views are in opposition to modern teaching regarding drainage; but these cases of acute puerperal sepsis form, in my opinion, a law unto themselves. Besides, I am inclined to think that the pendulum in the question of drainage at the present time has swung a little too far in the opposite direction.

There is another point regarding technique upon which I would like to touch—*i. e.*, the route. According to my experience, the abdominal route is to be preferred. In the one instance in which I was induced to adopt the vaginal one I had to abandon it, owing to the great friability of the uterine tissues. In this attempt the patient lost more blood than she did during the remainder of the operation, which was

[1] The case bears considerable resemblance to one reported by A. De Pourtales (Archiv für Gynäkologie, Band lviii., Heft 1) from Bumm's clinic (the home of bacteriology in puerperal sepsis). In Pourtales' case, on the twenty-second day of the puerperium, after several periods of apparent quiescence, the infection evidently extended from the uterus to the right broad ligament. Instead of opening the abdomen, as was done in my case, the uterus was subjected to permanent irrigations and the patient to cold packs, cold douches, etc., with the result that death occurred six days later—*i. e.*, on the twenty-eighth day of the puerperium. The autopsy revealed purulent peritonitis and suppurative thrombosis of the pelvic veins, secondary to suppuration of the thrombi at the placental site. On the fourteenth day of the puerperium the patient was curetted, and the uterine discharge was examined bacteriologically. No streptococci were found. On the twenty-second day the uterine discharge was again examined, and this time streptococci were detected. Could a better illustration be offered of the unreliability of bacteriological examination even in the most expert hands?

carried out from above. I find that even patients who are profoundly septicized and who go to the table, say with a temperature of 105° F. or over and with a pulse of 160, will withstand a hysterectomy fairly well, providing that there has not been much loss of blood; and it seems to me that hæmostasis can be better attended to when operating through a good-sized abdominal incision than when operating through the vagina.

Lastly, we come to a class of cases in which, as a result of puerperal infection, a fairly large collection of pus forms in the pelvic and lower abdominal cavities. Every one is agreed that here the surgical principle of giving exit to pus, whenever and wherever it exists, should be adhered to, and yet it is just in these cases that a cautious and conservative course finds its justification. Of course, if the collection is so situated that it can readily be evacuated by an incision in the vagina or by one above either of Poupart's ligaments, so that the peritoneal cavity is not entered, no time should be lost in carrying it out; but it not infrequently happens that the collection is so placed that it cannot be reached by either of these incisions. We are then forced to sit on the horns of a dilemma—on the one hand, we are in danger of losing our patient through hectic exhaustion or through general pyæmia; on the other hand, we may kill our patient in the attempt to get rid of the pus by setting up a rapidly fatal peritonitis—for it cannot be too forcibly borne in mind that the pus in acute puerperal sepsis is highly virulent and that the slightest soiling of the peritoneum with it is almost certain to be followed by disastrous results.

It is my custom in these cases to keep them under close observation and to wait cautiously for an opportune moment to intervene. Fortunately, the very circumstance that a pelvic abscess has formed argues that the process is localized and that judicious delay is not attended with any great danger.

In some cases, if the collection is in the upper part of the broad ligament, and it is doubtful if it can be reached by an incision above Poupart's ligament, I make an incision in the median line at a point above the upper limits of the mass. I then carefully inspect the relations of the mass with the abdominal wall and observe if any coil of intestine intervene between the two. If there be no coil of intestine in the way and the mass is adherent directly to the abdominal wall, as frequently happens, the median incision is closed; an incision is then made directly over the mass and the pus evacuated without entering the general peritoneal cavity. When feasible, a counter opening is made in the vagina and through-and-through drainage established.

When following this method the greatest care must be observed not to break down the adhesion which shuts off the pus collection from the abdominal cavity. In my first case I manipulated a great deal with my fingers to ascertain the exact relationship of the mass, and, before I

was aware of it, some pus appeared; and although the intestines were apparently well protected with gauze compresses, the patient promptly died in forty-eight hours from septic peritonitis. Since then I have been more cautious and have not had a repetition of the accident.

The two following cases, occurring recently in my practice, will illustrate my meaning:

CASE VIII.—Mrs. S. had been delivered of a child six weeks before I saw her. She had not made a good recovery from her confinement, felt weak, had some pain in the abdomen, and had a small, rapid pulse. The temperature for most of the time was about normal (she had not been kept under close observation). On examination the uterus was slightly enlarged, and extending from the right horn was a hard mass, with which it seemed intimately connected. The mass was not very sensitive; it was moderately fixed, moving slightly with the uterus. The right tube and ovary could be palpated independently of the mass.

I made the diagnosis of an exudate in the upper part of the broad ligament, and advised delay and palliative measures. Four weeks later I was called to see the patient again. Her general condition remained about the same. She was up and about the greater part of the time. The mass had grown somewhat larger, was now adherent to the abdominal wall, even bulging it outward. The patient was admitted into St. Mark's Hospital, where I made a good-sized incision over the mass, about two inches above Poupart's ligament. After cutting through the abdominal wall about six ounces of pus were given exit. A counter opening was made in the right lateral fornix of the vagina. In about four weeks the patient was able to leave the hospital, and two weeks later the fistulous track had closed. Her general health had by this time improved very materially. When seen by me two months later she had fully regained her health; the pelvis was free from exudate, the menses were regular, and she did not have a symptom referable to the pelvic organs.

CASE IX. was seen by me February 27, 1899. She had been delivered with forceps on January 26th. Had considerable post-partum hemorrhage. Placenta came away entire. On the fifth day of the puerperium the temperature was 104° F., pulse varying from 110 to 130. Considerable pain in the left groin. For the next two weeks the temperature ranged from 100° to 104° F., pulse from 110 to 120; then the temperature fell to the normal. She got up out of bed on the fourteenth day and remained up for a week. During this time the pain in the left groin had grown worse and more constant. At the end of the week she sent for her physician, who found her with a temperature of 104° F., and he put her back to bed.

At the time of my visit she had a temperature of 102.4° F. and a pulse of 120. Her general condition was fairly good. The abdomen was somewhat distended, especially below the umbilicus. It was very rigid and rather sensitive to pressure.

On bimanual examination there was an ill-defined mass on the left side, the upper boundaries of which were difficult to determine on account of the abdominal rigidity. There was considerable resistance in the right iliac fossa. The uterus could not be outlined independently of these pelvic masses. At no point could any fluctuation be detected.

I advised palliative measures and opium suppositories to relieve the pain. The patient was to be carefully watched, and as soon as any fluctuation was evident a good-sized vaginal incision was to be made and drainage employed. The attending physician called on me five days later and informed me that the patient had passed a small amount of pus per rectum three days ago; that the discharge had ceased yesterday; that the temperature was 99° F., and that the general condition of the patient was good.

On March 12th (a week later) he asked me to see the patient again, as she had not been doing so well for the past few days. I was surprised to find that now the whole lower part of the abdomen was occupied by a hard mass, which reached midway to the umbilicus. Fluctuation was not evident, either through the vagina or abdominal wall. The patient was at once transported to St. Mark's Hospital, where, on the following morning, I operated upon her. I first made a large incision in the posterior vault of the vagina, then passed my fingers through the incision, but could not reach any abscess-cavity. I next made several punctures with an aspirating needle into the mass through the vaginal incision, but no pus was obtained. The vaginal incision was now packed with iodoform gauze and an oblique incision was made about two inches above the right Poupart ligament, and the mass was reached after cutting through the abdominal wall. It was covered with peritoneum, but appeared to be shut off by adhesion from the upper peritoneal cavity. After making several punctures in various directions with an aspirating needle some pus was encountered. An incision at this point was now made, with the needle as a guide, and a cavity opened, containing about four ounces of pus. With the finger in this cavity an effort was made to reach some other purulent foci, which I felt confident existed, but without success. I then made an incision over the mass in the median line, and, although I cut cautiously, I found I had entered the bladder, which lay stretched over the mass for fully three inches above the symphysis. The bladder was at once sutured, and, adopting the same measures as before, another abscess-cavity was found at the upper third of the mass. The finger was made to enter this, with the view of breaking into some other pus-cavities, but it did not encounter anything but hard and unyielding tissue. A third incision was made in the left side, and a third abscess-cavity, containing about six ounces of pus, was opened. By using considerable force with the fingers I was enabled to connect the abscess-cavity in the median line with that on the left side, but I could not break through the exudate downward so as to reach the vaginal incision and obtain through-and-through drainage. As may be readily conceived, with a subject who had been septic for over six weeks, the pulse had by this time become very feeble, and I desisted from any further attempts to obtain drainage through the vagina. The patient made a slow recovery; the opening in the bladder began to leak about a week after the operation, but with the aid of a permanent catheter in the bladder the fistula closed in about three weeks. The patient left the hospital on April 30th, with all the wounds healed excepting a small, deep, fistulous track[1] on the left side. From being a mere skeleton, with a large, sacral decubitus,

[1] Since the above was written the fistula has closed, the patient is perfectly well, and menstruates regularly, November 1, 1899.

when she entered the hospital, she left it with a good color and having gained fifteen pounds in weight.

It seems to me that in the foregoing case any other course than the one carried out would have been attended with dire results. It would have been unwise, even were it feasible, to have attempted anything more radical than what was done. There was absolutely no possibility of determining the position of any of the pelvic organs. The whole lower third of the abdomen was as completely filled with the mass as if molten lava had been poured into it and allowed to harden. Not to have intervened surgically would have meant prolonged suffering, with doubtless a fatal termination. Every one will recall having seen such neglected cases and the ghastly spectacle they presented—mere skeletons covered with bed-sores, riddled with purulent sinus tracts. Surgery cannot do anything for these unfortunate cases at that stage, and death is looked upon as a kind savior.

The points I have endeavored to make in this paper are:

1. Puerperal sepsis is wound fever or wound infection, and wound infection in the female genital canal, as elsewhere, calls for surgical measures, such as free drainage, irrigation, and the removal with a sharp instrument of any débris or exudate that may form on the surface of the wound. These means failing to accomplish the desired result, ablation of the diseased organ or organs as a *dernier ressort* is indicated.

2. In a given case of puerperal sepsis a thorough search is to be made of the whole of the genital canal in order to determine the site of the original infection.

3. If this is situated in the uterus, curettage, drainage, and irrigations are to be employed. In 95 per cent. of the cases of puerperal sepsis nowadays met with this plan of procedure will be all that is necessary to bring about a cure.

4. In the remaining 5 per cent., roughly speaking, these measures will not be efficacious to arrest the progress of the infection, as will be evidenced by the pulse, temperature, general course of the disease, and sometimes by local signs. An exploratory laparotomy is then indicated, the further course to be guided by the pathological lesions found. In most of these cases total hysterectomy will be required.

5. When large collections of pus form and are so situated that they can be readily reached either with a vaginal incision or with one above either of Poupart's ligaments, no time should be lost in resorting to surgical relief. When, however, they are not so favorably situated, judicious delay is advisable, with the hope that ultimately the pus may be evacuated without the risk of soiling the general peritoneum.

Such a course not only averts the risks to which the patient would be exposed by a more radical procedure, but affords her an opportunity of being restored to health with the conservation of her sexual organs.

A CASE OF "FAMILY PERIODIC PARALYSIS."

By James J. Putnam, M.D.,
PROFESSOR OF DISEASES OF THE NERVOUS SYSTEM, HARVARD MEDICAL SCHOOL, BOSTON.

It will be remembered by those who have followed with any care the recent neurological literature, that a year and a half ago Dr. E. W. Taylor[1] published the remarkable history of eleven cases of the curious disease indicated in the title of this paper, all occurring in one family, in the course of five generations, and gave an admirable summary of all the cases, relatively few in number, which had hitherto been recorded.

A year later Dr. J. K. Mitchell[2] reported the case of another patient, also one of several occurring in the same family, whom he had had the opportunity to watch for a long period in his hospital wards, and had studied with painstaking thoroughness from various points of view.

In brief outline these cases are characterized mainly by a tendency on the part of the patient, generally a young or middle-aged and previously healthy person, to become rapidly paralyzed, usually in the night, so that for the space of the seizure, one or two days in length, he is incapable of voluntary motion, except as far as the face, eyes, and respiratory muscles are concerned, and not only this, but the electrical and the reflex excitability of the affected muscles is diminished or lost, so that powerful faradic or galvanic currents—even when, as in Dr. Mitchell's case—applied with needles thrust into the substance of the muscles, are powerless, at the height of the attack, to excite any response. The reflex and automatic movements necessary for organic and vegetative life are rarely much involved, but even these are not always wholly free, and the heart sometimes becomes temporarily enlarged. The sensibility is rarely if ever affected. Many members of a single family, in the same and successive generations, are apt to be affected.

Most of the cases reported from either side of the ocean have been closely alike, but whereas it has hitherto been the striking resemblances which have attracted most attention, before a final opinion as to the nature of the disease is reached, the discrepancies between the different instances, which are by no means insignificant, will also have to be fully taken into account.

The patient whose case I have to report[3] is a young man, aged twenty-four years, of good health and of rather unusual muscular development, so much so that at one of my visits he showed me a series

[1] Journal of Nervous and Mental Disease, November, 1898.
[2] The American Journal of the Medical Sciences, November, 1899.
[3] I am indebted to Dr. Sidney A. Lord for the notes of an additional examination which he made on November 26, 1899.

of dumb-bells running up to ninety pounds with which he was accustomed to exercise. This great strength is noteworthy, because it is possible that it is a stigma of morbid tendency rather than a sign of balanced health.

He was said to be of a rather nervous temperament, but showed no marked signs of this at either of my three visits. The father, mother, two brothers and a sister are living and well, and present no peculiarities of note, except that the sister has leucodermatous patches on various parts of the body. No other case of periodic palsy has occurred in the family, but it is needless to remark that there must have been at one period an isolated first case of the groups already reported.

The first attack in my patient's case occurred when he was fourteen years old, and since then severe seizures have recurred at intervals varying from one to seven months, with lighter attacks interspersed between them. The frequency of the severer attacks has been growing less as years have gone on.

As a rule, the attacks have occurred on Sunday or Monday, and it is noteworthy that the same tendency toward recurrence on a certain day of the week was observed in Dr. Mitchell's case, and in one of Goldflam's.[1] It will be remembered that the same sort of thing is often spoken of by patients with migraine. Possibly half-conscious expectation has something to do with the fact, and possibly, too, the patient falls into the habit of noting more carefully the attacks which seem to favor this singular preference for a special day. On the other hand, it is conceivable that the special occupations of the day preceding that on which the attack usually falls may be found to have a predisposing influence, or, again, that the tendency is an affair of cyclic recurrence.

The seizures repeat themselves with great constancy, and are of about the following sort: The onset is generally rapid, the patient going to bed in his usual health and waking in the morning unable to move hand or foot, though premonitory signs sometimes present themselves a day or two before, in the form of a slight tendency to toe-drop. His mother says, also, that he is apt to be irritable and excitable a day or so before the attack comes on.

In the severer seizures the paralysis is so complete that the patient can move few muscles except those of the lips and eyes. If the head slips off the pillow, or the arm off the bed, it must remain until someone comes to replace it.

The sensibility is said to be perfect, both that of contact, temperature, pain, and that of the position of the limbs. When the paralysis is not complete the limb feels excessively heavy on attempts at movement.

[1] See Taylor, loc. cit.

The attacks vary in length from a few hours to two or three days, and after they are substantially over several days or a week may elapse before his muscles regain full power. A slight attack can sometimes be worked off if the patient insists on getting up and exerts the effort necessary to haul and shove himself about for a time. A temporary improvement brought by strenuous efforts of this sort is, however, followed by a specially severe seizure, and this, too, has been noted for other cases (Taylor). His mother says that he looks pale and yellow during an attack, and he is apt to feel very sleepy and tired during the first few hours. He usually takes but little food or drink, because he has found that larger quantities make him worse. On being questioned as to the amount of urine passed during the days of illness, he said at first that it was very small, but afterward was inclined to think that the peculiarity lay not so much in the diminution of quantity as in the fact that the need of micturition was reduced, so that he emptied the bladder perhaps only once in twenty-four hours. He would often vomit during an attack, especially if food were taken.

As regards the order in which the different movements are affected, it appears that the dorsal flexion of the foot is always the first to go, and the patient makes the statement—important, if true—that he used to notice a weakness of the muscles required for this same movement after exercising for some time on high jumping in the gymnasium, even before his fourteenth year, when the illness ostensibly began. His next difficulty is usually that of rising from a chair and extending the leg at the knee. At this stage of the attack he can sometimes walk about by using great care to keep his knees stiff, but cannot get up if accidentally thrown down. There is no palpitation, but there is a sense of oppression, associated with difficulty in taking a long breath. There is no sweating or itching, such as has been reported of some of the other cases. He says that his hands are apt to look bigger and redder during the attack, but his mother thinks that they are usually cold.

As regards predisposing causes, the only one which has impressed him as at all important is taking too much food. Thus he has thought that late suppers sometimes provoked an attack on the following day, and has explained the tendency for the attacks to occur on Monday by his habit of staying at home on Sunday and eating more generously than usual. He formerly thought that excessive physical exercise provoked seizures, but has rather given up that theory, in view of the fact that he took a bicycle trip not long ago, of two months' duration, during which he rode upward of eighty miles a day without being troubled with any signs of illness either at the time or later.

The paralysis usually comes on during the night and passes off during the night, at least for the most part.

The patient was never regularly under my care for any length of time, and the only outbreak in which I had the opportunity of making a personal exmination was one which occurred on August 23, 1899, when I was called as the seizure was passing away. I then found him sitting in an easy chair, with his hands resting on his knees and his feet on a stool. He was at that time able to move the head freely and to open and close the jaws. The motions of the fingers and hands were fairly free. The toes could be moved and the feet also, though but feebly. Extension and flexion of the arm at the elbow and of the leg at the knee were possible, though performed with great difficulty, but there was no motion at the shoulder or hip. In fine, the movements at the root of each limb were much more seriously impaired than those at the extremity, the reverse of what is seen in toxic multiple neuritis. The electrical irritability of the various muscles and nerves corresponded almost exactly to the degree of paralysis. Thus I was unable to obtain any reaction with the strongest currents produced by a Barrett chloride of silver faradic battery, in the deltoid, biceps, or quadriceps extensor cruris. On the other hand, the interosseous muscles gave prompt response to strong currents, with the stimulus applied either at the motor points or on the course of the ulnar nerve. Stimulation of the peroneal nerve caused feeble contraction in all the muscles supplied by it. The knee-jerks were absent, and likewise the abdominal and plantar reflexes, though the tickling of the foot was felt to an unpleasant degree. The area of cardiac dulness was not noted.

An examination made in the interval between seizures showed everywhere normal electrical reactions. The muscles were found to be exceedingly firm and massive. The knee-jerk, though present, was rather slight, less than usually seen in health. An examination of the blood failed to show the lymphocytosis observed by Taylor.

The writers who have hitherto studied this singular malady have been inclined, as a rule, to seek for some special poison, probably of autochthonous origin, but acting perhaps somewhat like curare, as the cause of the symptoms. The idea is a natural one, and the superficial likeness between the condition of these helpless patients and that of a curarized animal is striking and suggestive.

As yet, however, even such searching investigations as those of Mitchell have failed to discover any especially toxic substance in the urine, and the question arises whether some new mode of approaching the problem cannot be found which may make the disease appear less strange, even if it is does not enable us to trace it to its origin. Such is, I think, the case, and I have been led to regard with increasing interest a view suggested to me, at the time of the reading of Dr. Mitchell's paper, by Dr. S. J. Meltzer, of New York—namely, that the symptoms are probably due to the morbid overaction of an influence

which, though hitherto but little recognized, probably plays an important part in all the operations of our lives, and which has been designated as "inhibition." Such study as I have been able to make of the matter, especially as presented in Dr. Meltzer's valuable review of the physiological aspects of inhibition (published in the *New York Medical Journal* for May 13 and 27, 1899) and in the recent monograph of the Italian physiologist, Oddi (*L'Inibizione dal punto di vista fisio-pathologico*, etc., Turin, 1898), have persuaded me that the idea is a fruitful one.

Before speaking of this theory in more detail, I wish to say that the safest way to begin the study of a new disease like this is surely to trace the clinical resemblances, even if only of the broadest sort, which exist between it and other disorders with which we are more familiar, and, in doing this, to recognize, just so far as the facts warrant, the bonds that may be found to link all the affections concerned to states of health, in the relationship of outgrowths and caricatures. Looking at the matter in this way it might be said that although, as Goldflam points out, this disease presents a closer analogy to the myotonias than to any other single affection with which we are familiar, yet, in the duration of the interval between the attacks, the length of the single seizures, their tendency to come and go in the night, their preference, in some cases, for certain days of the week, periodic palsy also recalls migraine; and were it not that some of the special features of the palsy appear so strange as to defy classification, the two affections might be ranged together in the category of the periodical neuroses, of which migraine is a prominent example.

But are these features really so incomprehensible? Taken in just the form in which they here show themselves they are certainly unique, but they are not, nevertheless, without their analogues. The three main characteristics are the palsy, the loss of reflexes, and the loss of electrical irritability. These phenomena appear and disappear in the same ratio, and it may turn out to be the case, as Dr. Mitchell's experiments with the needle-electrodes foreshadow, that the basis of this state of affairs is a loss of excitability of the muscles themselves, and not alone, or perhaps not at all, of the nerves. In this respect, indeed, these cases stand by themselves. On the other hand, functional palsies of one or another sort, more familiar than this, and perhaps of similar or analogous origin, are common enough. Not to speak of the effects of certain poisons, such as curare and conium, or the idea-paralyses of hysteria, we have, for example, the palsies due to the inhibition of shock, those which accompany severe neuralgias, such as migraine and supra-orbital neuralgia,[1] and those which occur as par-

[1] I have recently seen a paresis of the third nerve, of this sort, which lasted for a week and then gradually disappeared with the subsidence of the attacks of pain.

alytic equivalents for the convulsion in epilepsy. The "night-palsies," the exact etiology of which is uncertain, should also be particularly borne in mind.

It has been common to offer "exhaustion" of cortical centres as an explanation of this epileptic paralysis, but the explanation was never a satisfactory one, and it has sometimes seemed necessary to invoke for the sake of it an antecedent seizure of momentary duration, of which there was often no evidence whatever.

It may appear that all these forms of functional palsy, including that which is especially under consideration in this paper, are due, in some measure at least, to the action of inhibition, and it should be remembered in this connection that, on other grounds, epilepsy has recently been regarded by Oddi[1] and others as a disease of impaired relations of inhibition between co-ordinated cerebral centres.

The case of the spinal reflexes is like that of voluntary movement, and they, too, as is well known, may disappear temporarily under the inhibitory influence of shock and agencies of kindred sort. Can the same statement be made with regard to electrical reactions?

The assumption that electrical irritability is a constant function of a healthy nerve and muscle, and one which cannot be made to disappear except as the result of a destructive lesion, has come to be accepted with almost axiomatic force in the physician's mind, and though it has long been a matter of knowledge that this irritability might disappear for a time under the influence of certain paralyzing poisons, and as a result of an electrotonus, and also that there is a time in the regeneration of nerve fibres (according to the assumption of Erb, when the myeline sheath is imperfectly formed) when this local irritability to electricity is still in abeyance, though their power of conduction has been regained, yet these facts have not led to any generalization such as make the loss of electrical reaction in "periodic palsy" easier of explanation. If, however, it can be shown that the phenomena just cited are only a portion of a larger number, and that the loss of electrical reaction, like the loss of a reflex or of the power of voluntary motion, is something that a nerve or a muscle may be temporarily deprived of under various conditions and yet continue to live, the ground will have been cleared for a fairer study of our problem. Still another step will have been made if it can be made probable that some of these phenomena were classifiable as instances of inhibition. A great difficulty in the way of accepting the latter view has been and still is the extreme vagueness of the conception for which that term stands. Great numbers of apparently heterogeneous phenomena have been classed as inhibitory. There is apparently a wide difference be-

[1] Oddi, loc. cit., p. 48 et seq.

tween the existence of the delicate adjustments through which the contraction and relaxation of antagonistic muscles are made to play into each other's hands, so as to subserve the purposes of co-ordinated activity and the varied phenomena of quasi-pathological "arrest," such as come to mind more especially in the present connection. But this present necessity of vagueness must not prevent us from accumulating data which may be of future service. It is certainly an important fact that when tetanic contraction has been excited by electrical stimulation of an anterior nerve root the application of suitable excitations to the spinal cord will bring on a diminished amplitude or even a complete cessation of the muscular contraction, which only slowly and imperfectly regains its former strength after the inhibitory stimulation has been withdrawn.[1] Similarly, a contraction due to electrical[2] excitation of the nerve in an isolated nerve muscle preparation may be inhibited for a brief time by the application of a solution of cocaine or of common salt either above or below the point at which the electrodes are applied, while mechanical irritation or chemical irritation of other sorts are either ineffective or reinforce the action of the electrical stimulus. It is true that the inhibition of the electrical stimulation in these cases is of relatively brief duration, but there is no inherent reason why this period might not be prolonged.

It becomes clear through these experiments that the obligation on the part of a healthy muscle to contract when its nerve is stimulated by electricity is by no means as cogent as most of us have supposed, and we should be prepared to scrutinize with new interest the perhaps kindred phenomena of loss of reaction due to an electrotonus and curare action, which have been so long a puzzle.

This would not be the place for a long discussion as to what is meant by inhibition, and how far the phenomena ranged by different observers under that heading really belong together; but it may be asserted that most if not all of the functions of the body are poised between two influences, each representing a fundamental property of the nervous system, one of which it is customary to speak of as an impelling and the other as a restraining influence, though such terms as these do not seem appropriate for every case. Under most circumstances these two forces work together, and we see only the single resultant, which usually takes the form either of motion or of what seems to be rest, but is actually, in the case of the muscle, a condition of tonic contraction, which is really a form of motion.[3] It is not difficult, however, to find cases in which the action of the inhibitory force is seen in an isolated form. A

[1] Oddi: Loc. cit., p. 48 et seq.

[2] Oddi, also Mosso, Rotondo: cited by Oddi, loc. cit., p. 35 et seq.

[3] "The Recent Study of Muscle-tonus," by Musgens (Neurologisches Centralblatt, 1899, xii.), is interesting in this connection.

few of these conditions have already been alluded to. Another of special interest is that which relates to the vascular mechanism of the submaxillary gland. These vessels are supplied by two sets of nerves, cerebro-spinal and sympathetic respectively, one of which conveys in general the tendency to contraction and the other to dilatation. When both nerves are stimulated together the vessels primarily contract, but when the stimulation is withdrawn the vasocontractors cease their action, while the vasodilators, on the other hand, continue to exert their force, and, for a time, the dilatation is seen as an isolated and active process.[1] The researches of Sherrington and others seem to make certain what has hitherto been doubted (Waller), that the action of the voluntary muscular system comes also under the influence of these two antagonistic forces in such a way that the relaxation of antagonistic groups of muscles is as much an active process as the contraction of those which seem to control the motion of the limb. Indeed, as Meltzer points out, Charles Bell demonstrated as long ago as in 1826 that relaxation instead of contraction could be made by a properly devised experiment to follow an electrical stimulus.

But if it is true that a stimulus, whether electrical or voluntary, may cause a muscle positively to relax instead of contracting, and true, also, as in the case of the bloodvessels of the submaxillary gland, that when the force which tends to make a muscle relax and that which tends to make it contract are set in motion together they preserve, nevertheless, their individuality, no great stretch of the imagination is needed for the conception that under certain conditions of disease the divorce between these two forces might be rendered more complete, and relaxation even with loss of electrical irritability, as in the cases of periodic palsy, be made to dominate the scene. Perhaps if we knew how to look for them the clinical history of various other neuroses would be found to present phenomena more or less equivalent to this loss of electrical reactions and arrest of spinal reflexes, and due, like them, to the action of inhibition.

We do not have an opportunity to test the reactions of the bloodvessels in migraine—which are sometimes paralyzed, sometimes spasmodically contracted—or of the cortical areas that seem at the same time to be thrown so strangely out of gear; but no one would be surprised to find that during a migraine attack the normal responses of these organs could not be obtained, just as in Graves' disease[2] it is hard to reduce the rapid pulse by digitalis.

It is, of course, true that even if the phenomena of periodic palsy could be referred to the influence of inhibition the question would still

[1] The reader is referred to Meltzer's paper for a large number of other facts bearing directly or indirectly on the case in hand.

[2] See Meltzer, loc. cit.

remain open whether we ought not to seek for some "poison" as a final cause of the broken equilibrium between inhibition and its opponent influence—call the latter dynamogenesis or what one will.

There can be no doubt that we should have to go back of the influence of inhibition for a "final cause," but it seems to me more rational to seek this in the tissues than in the fluids of the body, perhaps better still in the correlations between different parts of the nervous system, or between the tissues and the fluids that nourish them. I cannot but think that in the long and hitherto so barren hunt after "poisons," which should account for the various neuroses in their varied and typically recurring forms, the conceptions which have been followed have been to a considerable extent crude, unreasonable, and misleading. Why should we expect, just because a person's nervous system is so constructed in respect to its relations with the nutritive fluid which bathes it as to be thrown periodically into what we call "morbid" activity, that the blood and urine should contain substances incompatible with the life of cats and mice—the test for the presence of poisons which has oftenest been applied? Is not this to show too little respect for the subtlety of these processes and for their relation to states of health?

Perhaps, indeed, all activity and all specialization of functions in health may be expressible in chemical terms, and in that sense the conclusion may be inevitable that morbid activity is similarly expressible, but it is by no means evident that the use of the term "poison" is more justifiable for the second case than for the first. As I have elsewhere indicated, in discussing the nature of infantilism and cretinism, it is often more fruitful to consider some of the abnormalities which we call disease as representing rather modified states of health, and striking as the clinical features of the diseased state may be, it is quite possible that the fundamental differences—the chemical differences, for example—between such a state and that which we call health is extremely trifling. A person with a liability to migraine need not be materially different, chemically speaking, from a person with a liability to a recurrence of hunger at meal-times, or of drowsiness at bedtime—that is, from a normal person.

In the ordinary condition of healthy muscles when at rest (so-called), as Dr. Meltzer has justly pointed out, the resultant of these two opposing forces of relaxation and contraction is shifted somewhat to the motion side, and therefore the tonus of the muscles. Yet one may easily conceive that under slight modifications of nutrition or growth of the nervous system its reaction even toward normal fluids should be so altered that the resultant of the two forces should be shifted periodically toward the side of relaxation.

If these views are just the proper way to study these cases of periodic palsy would be less through the methods of physiological chemistry

than through those of physiology. It may prove, to quote Dr. Meltzer again, that these patients are peculiarly susceptible to inhibitions of one or another sort, even in their intermediate states. On the other hand, the phenomena which this curious disease presents can, I believe, also be studied profitably, with a view to broad resemblances between it and one or another of the so-called "neuroses," and with the idea constantly in mind that the neuroses are probably but caricatures and outgrowths of states of health.

This would not be the place to attempt the reproduction of the arguments as to the final nature and definition of "inhibition." So far as they are capable of summary this is clearly and finely given in the concluding pages of Oddi's monograph, of which I can cite here only a part of the concluding paragraphs:

"The view," he says, "that we find ourselves absolutely forced to reject . . . is that which assumes the existence of centres and nerves endowed with the sole function of inhibition. . . . Inhibition, on the one hand—as dynamogenesis on the other—is a fundamental function of the nervous system, one of the two opposing forces between which the great game of life is played; the manifestation of one sort of protoplasmic irritability, of one species of excitability on the part of the nervous system. Its true nature will be known only after we have gained an exact knowledge as to the real essence of nervous force."

Perhaps it would be possible to assume that with every wave of impulse which is set in motion within the nervous system a wave of arrest is likewise started, as a swinging pendulum swings back again, though the effect of the wave of arrest may not become apparent. It is also obvious that we have no right to exclude the impulses which we call inhibitory from being themselves, under certain conditions, the subjects of inhibition.

Another question remains to be considered—namely, whether the occurrence of the rare or anomalous cases and symptoms, of which a sketch is given in Dr. Taylor's paper, makes necessary a modification of views as to the nature and etiology of the disease? The presence of slight, persistent alterations of nutrition of the muscles, in the direction of atrophy (Oppenheim) or of hypertrophy (Bernhardt[1]), or as causing permanent changes in electrical reaction (Oppenheim, Goldflam), might seem to show conditions which could not be classed as "functional," but to this might perhaps be rejoined that the division between "functional" and "organic" is one which can only be arbitrarily drawn. Not only does "hysteria" lead to "organic" disease, but it must also be said that at every moment we pay for life with life.

[1] Taylor doubts the admissibility of Bernhardt's cases, but they represent at least an analogous affection.

The curious points of likeness, such as they are, between periodic palsy and myotonia, and the fact that Rich's[1] cases, in which a tonic condition of the muscles was observed (electrical changes not noted), seem to stand as a connecting link between the two affections, tend to substantiate, it seems to me, the view that we have to do with a subtle disorder of the physiological co-ordinations of health rather than with a general poison. The same might also be said of the tendency to muscular hypertrophy in Bernhardt's case, which recalls again the very massive and powerful muscular development in Taylor's case and mine. The functional weakness of the heart, bladder, and intestine might be due, as was suggested in a private letter by Dr. Meltzer, to a general increase of the inhibition function of the spinal cord; and that this should be of periodical occurrence is really no more remarkable than that the same is true of menstruation in health, and, in sickness, of epilepsy and migraine.

THE INCREASING PREVALENCE OF CANCER AS SHOWN IN THE MORTALITY STATISTICS OF AMERICAN CITIES.

By G. Betton Massey, M.D.,
of Philadelphia.

After many years' inattention to the subject, the medical profession has recently awakened to the fact that mortality statistics show a rapid increase in the prevalence of cancerous affections during the past thirty or forty years. According to several writers, this increase has not occurred in the less civilized countries of the world, though it is evident that exact information on this question is necessarily lacking, and particularly so when we remember that the collection of vital statistics is a governmental duty that is liable to be discharged by civilized countries in a manner closely in unison with their position in the scale of civilization, and that those collected by many countries ranking high in the scale leave much to be desired in accuracy and fulness.

It is, nevertheless, the opinion of competent observers that cancerous affections are not common among barbarous peoples. Herbert Snow, of the Brompton Cancer Hospital, in London, states in a recent work[2] that Davidson's *Geographical Pathology*, published in 1893, while showing the prevalence of cancer in Europe and the United States, affirms its rarity or entire absence in Arabia, East Central Africa, Bechuanaland, Faroe Islands, Gold Coast, Guiana, Iceland, Jamaica, Mauritius,

[1] See Taylor, loc. cit.

[2] Cancerous and Other Tumors. By Herbert Snow, M.D. London, Ballière, Tindall & Cox, 1898.

New Caledonia and Persia, with a conflict of testimony with respect to Abyssinia.

Concerning the prevalence and increase of these affections in the most highly civilized countries, the testimony is exact and most startling. The figures given by the Registrar-General's Report for England and Wales during thirty-one years (see Chart IX.) show that there has been an increase from 38.5 persons dying from cancer in 100,000 living population in 1864 to 75.5 dying from cancer in 100,000 living in 1895—in other words, the ratio of the mortality from cancer has almost exactly doubled in England and Wales during the thirty-one years preceding 1895. Snow states that the deaths from cancer in Ireland in 1864 were 1498, with a population of 5,678,307. In 1884, with a decrease of population to 4,962,693, an increased mortality from cancer of 1947 is recorded. In Scotland the population in 1864 was 3,118,701, with 1300 victims of cancer; in 1884 the population was slightly increased, and the cancer mortality was 2110.

The condition of affairs is probably becoming quite as bad in America, and, in a recent paper,[1] Roswell Park makes the prediction that if the present rate of increase of cancer in New York State continues during the next ten years its mortality will become greater than that of consumption, typhoid fever, and smallpox combined.

The accuracy of these deductions has been more recently challenged by Edmund Andrews, of Chicago,[2] on the grounds that the population figures are inaccurate, and that no allowance has been made for a lessened mortality of young people which has been achieved during recent years in most civilized countries. He shows that the average age of those dying in Chicago of all affections has been nearly doubled in twenty-six years.

These objections of Dr. Andrews are twofold, and need separate consideration. His only objection to the deductions from the ratio of cancer deaths to the living population are the inaccuracy of census reports, both as to mortality statistics and population. The inaccuracy of the census mortality reports is freely granted by the present writer, as it is evident that they are based on the most insufficient and inadequate data in the portions of the country where burial certificates are not required, and, until the last day of the enumeration no report will contain even the hearsay evidence of the whole year in that district.

But to claim that our population counts of living persons are not sufficiently accurate for this purpose is decidedly hypercritical. Assuming their reasonable accuracy, the remainder of the objection to the comparison of cancer deaths to living persons is effectively set aside by

[1] Medical News, April 1, 1899, vol. lxxiv. p. 385.
[2] Journal of American Medical Association, June 24, 1899.

the statistics which I have gathered from a number of the large cities of the United States in which the registration of the causes of death has been obligatory for many years, and which are here collected and published for the first time. The population of these cities for intercensus years is merely estimated, it is true; but these estimates have been frequently checked off by municipal enumerations. As no decedent can be buried in these cities without certification and registration, it is evident that the total deaths from cancer mentioned in the tables for each year have only one source of inaccuracy, and that is a mistaken diagnosis on the part of the attending physician; and in an affection so easily diagnosticated in its last stages by mere laymen, this source of inaccuracy must be small indeed.

When the number of cancer deaths in each of these cities for a period of years is reduced to the ratio per 100,000 of living population, and the ratios are represented on graphic charts, a mere glance will show that the proportion of cancer deaths to the living population is on the increase in all of these cities, and in each city the increase is shown to be so gradual and sustained that there can be but one conclusion drawn from the figures. The charts show, also, by means of a dotted line, the ratios of cancer deaths to each 1000 of all deaths in each city. These figures show a sustained increase for each city also, though not so great an increase as the ratios per living persons.

It is true, that the population figures, on which the ratios in these charts are based, represent total populations and not merely the number of adults living above thirty-five years of age. It has been impossible to get these corrected populations, and it is probable that such a correction of the figures would lessen the ratios somewhat, though not materially.

Dr. Andrews' objection to the ratio of cancer deaths to the total deaths needs more careful study. It is evident that a lessened number of deaths from certain preventable and curable affections of early life might give rise to an artificial increase in the proportion of a disease of maturer years which has not been prevented or cured. But if this is the cause of the increase of the ratio of cancer deaths to the total deaths, this increase should be even greater than that compared with the living population.

There can be but one conclusion from a careful consideration of the fact that the ratio per living population, which shows the actual increase in cancer, is greater than the ratio to total deaths in a lessening death-rate, and that is that some other disease or diseases of mature life are also on the increase. It is likely that these other affections are diseases of the kidneys and of the heart.

The American mortality rates of cancerous affections given in this paper represent the first compilation that has been made from the reg-

istration returns of the cities mentioned and are official, having been prepared for me by the statistical officers of the departments of health of each city. The figures in the earlier years are doubtless somewhat smaller than they should be, owing to the possibility of primary malignant diseases of the stomach and of other internal organs having been returned incorrectly, but this could not have been so of deaths from secondary internal growths following external cancers, where even a layman can make a correct diagnosis. The increased diagnostic ability of the profession in the detection of primary internal cancer must, therefore, count for something in considering these figures, but no reasonable person will believe that this element of uncertainty could have had any serious effect in causing so regular and even an increase in the deaths attributed to cancer throughout American cities, and the conviction is warranted that there is a wide-spread increase in the causes of these affections, or the liability to acquire them, throughout the country.

It appears from these tables that the greatest increase has occurred in the city of San Francisco, where the ratio has crept up from 16.5 cases in 100,000 population in 1866 to 103.6 cases to 100,000 in 1898. This enormous increase of more than six times as many cases in thirty-two years is deserving of special attention by the people of that city.

The city of Boston shows the next most considerable increase, the ratio of cases to living persons having almost trebled in the twenty-four years between 1863 and 1887. After the latter date there was a temporary decrease, followed by a tendency to increase to the present time.

In Chart VIII. the writer has combined the figures given in the seven preceding charts, this chart representing, therefore, the combined cancer mortality of the seven largest American cities, exclusive of Chicago, whose records were probably considered by its officials of too recent date to be valuable in this connection. The years from 1870 to 1898 only have been included in this chart, which, therefore, must be a reasonably accurate record of cancer deaths under modern conditions of diagnosis. The chart shows that in these seven American cities, with a combined population in 1870 of 8,207,464, there were 999 deaths from cancer, or 35.4 deaths per 100,000 living persons. In 1898 the population of the same cities, inclusive of Brooklyn, now a portion of New York, was 7,035,235, and there were 4273 deaths from cancer, or 66.4 deaths per 100,000 living persons, showing that the ratio of cancer deaths to the living inhabitants of these cities had almost doubled in the comparatively short time of twenty-eight years.

Believing that the registration of deaths in these seven cities has been reasonably accurate in recent years, and that the large aggregate population tends to eliminate mere chance, the writer has ventured to reproduce in the broken line in this chart the mean increase if the same rate

of increase is maintained until the year 1910, showing that under these conditions there will be an average of 80 deaths in each city in that year to every 100,000 living persons.

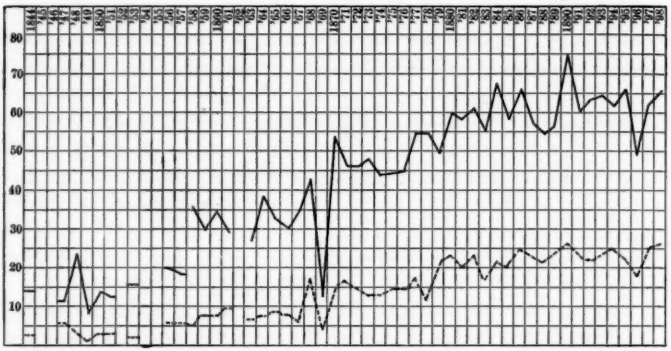


CHART I. NEW ORLEANS.

Representing the mortality rates of cancer in the city of New Orleans during fifty-four years. The continuous line shows the number of deaths from cancer per 100,000 living persons in the years represented by the vertical spaces. The broken line represents the number of cancer deaths in each 1000 deaths from all causes in the same years. The figures for some of the earlier years are wanting. (From figures kindly furnished by Dr. Sidney F. Théard, Secretary of Board of Health, New Orleans.)

Chart IX. is a graphic representation of the same figures for England and Wales, as given in the returns of the Registrar-General of

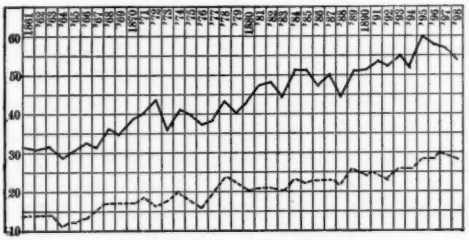


CHART II. PHILADELPHIA.

Representing the cancer mortality rates in Philadelphia during thirty-nine years. The continuous line shows the number of cancer deaths per 100,000 living persons; the broken line the number of cancer deaths per thousand deaths. (From figures kindly compiled by J. V. P. Turner, Registration Clerk of Board of Health, Philadelphia.)

Great Britain, showing that these diseases are more prevalent in that country than has yet been shown to be the case in America, though the rate of increase, which amounts to a doubling of the figures in about a

generation, is practically the same in both countries. The sustained steadiness of the increase when large numbers of cases in a large population are studied is well shown in this chart.

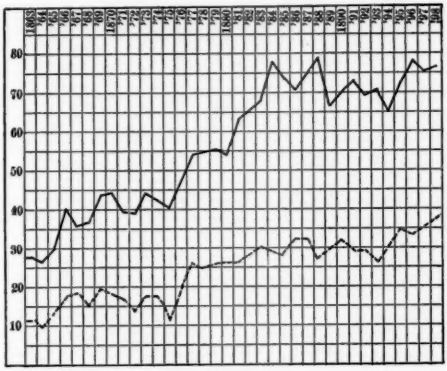


CHART III. BOSTON.

Representing the cancer mortality rates in Boston during thirty-five years. The continuous line shows the number of cancer deaths in 100,000 living persons; the broken line the number of cancer deaths per thousand of all deaths. (From figures kindly furnished by the Registrar of the Board of Health, Boston.)

There remains but one other inquiry answerable in these figures to impress the importance of this subject on the medical profession and on humanitarians in general, and that is: What indications do these figures give of the number of living persons that now suffer from these affec-

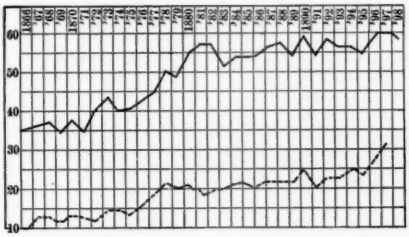


CHART IV. NEW YORK CITY.

Representing the cancer mortality rates in New York City during thirty-two years. (From figures kindly furnished by Dr. Roger S. Tracy, Registrar of Records, New York City.)

tions? All the foregoing statements refer to deaths alone. What of the living? To approximate the number of persons now suffering from cancerous affections in the United States, in the absence of reports, it is safe to assume that, since the average life of a case is in the neighbor-

hood of two years, there must be twice as many living at a given moment as will die during the year. Now, according to the combined table of seven American cities given in this article there were 664 deaths per

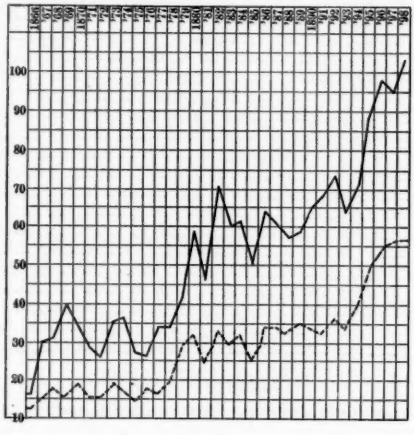


CHART V. SAN FRANCISCO.

Representing the cancer mortality rates in San Francisco during thirty-two years. (From figures kindly furnished by Dr. W. H. Griffin, Health Department, San Francisco.)

1,000,000 inhabitants in 1898. Extending these figures to the 75,000,000 inhabitants of the whole country (and it is well known that there is

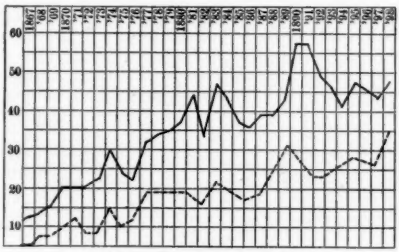


CHART VI. ST. LOUIS.

Representing the cancer mortality rates in St. Louis during thirty-one years. (From figures kindly furnished by Dr. Max C. Starkloff, Health Commissioner, St. Louis.)

even a greater relative number of cases in rural than in urban districts) shows that there must have been 49,800 deaths from cancer in the United States in 1898, and that at the present moment there must be

about 100,000 victims of the disease within our borders. And this great army of sufferers is by no means made up of the aged and infirm. The

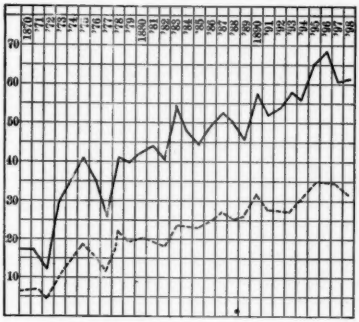


CHART VII. BALTIMORE.

Representing the cancer mortality rates in Baltimore during twenty-eight years. (From figures kindly furnished by Dr A. K. Hadel, Health Department, Baltimore.)

greater number of the victims are attacked in the prime of life and while in the possession of vigorous bodily powers—some, indeed, even in youth.

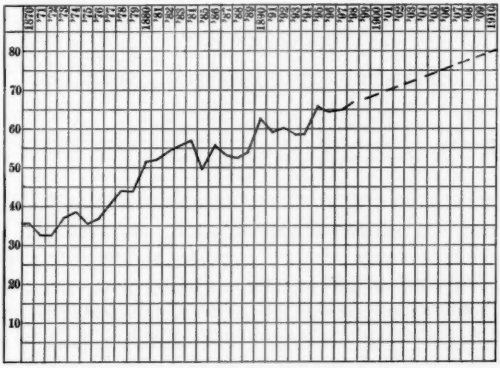


CHART VIII. COMBINED CANCER MORTALITY OF SEVEN AMERICAN CITIES.

Representing the combined ratios of cancer deaths per 100,000 living population shown in the preceding seven charts, to which is added a broken line showing the probable rate of increase until the year 1910.

What is being done for these unfortunates? Aside from operations in private and in ordinary hospitals, it may be said to be comprehended entirely in the establishment of one State laboratory of research and

one special cancer hospital, and it is said that the general interest in the subject continues so apathetic that the latter institution does not confine its attention to cancerous diseases, but employs its facilities in other lines of surgical work.

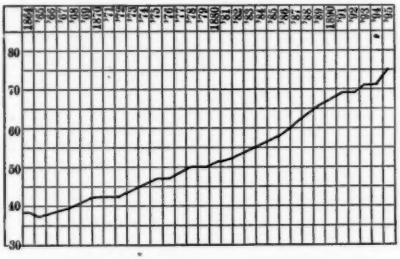


CHART IX. ENGLAND AND WALES.

Representing the rate of cancer mortality per 100,000 living persons in England and Wales during thirty-one years (drawn from the figures given by the Registrar-General).

NOTE.—The charts appearing in this paper are approximate representations of the tabulated figures. The tables themselves are too voluminous for these pages, but will be published elsewhere.

NARCOLEPSY.

A CONTRIBUTION TO THE PATHOLOGY OF SLEEP.

BY D. J. MCCARTHY, M.D.,
ASSOCIATE IN WILLIAM PEPPER CLINICAL LABORATORY, UNIVERSITY OF PENNSYLVANIA; ASSISTANT IN NEUROLOGY, PHILADELPHIA POLYCLINIC.

NARCOLEPSY, according to Gelineau, who first described the affection, is a peculiar neurosis characterized by an irresistible desire to sleep, occurring suddenly, of short duration, and recurring at frequent intervals. Repeated attacks of sleep, or deep somnolence, associated with a tendency to fall or sink to the floor, constitute the entire disease. That few of those who have written on this subject have agreed with him, either in this picture of the affection or its clinical significance, a short glance at the literature is sufficient to indicate.

Disturbances of sleep had long since been the *bête noir* of the clinician, and up to Gelineau's time had found no mention in the textbooks and but little in the literature. It is, therefore, not surprising that following the publication of Gelineau's articles many cases, widely different in their nature, should find their way into the literature under the name of narcolepsy. In many of these cases, at least, a careful

clinical examination would probably have yielded a simple explanation in some underlying visceral or general functional disease. The era of enthusiasm yielded finally to the era of skepticism, and we find to-day Eichhorst speaking of narcolepsy, or narkoepilepsie, as one of the occurrences of epilepsy; Oppenheim, as a symptom of hysteria and epilepsy, and Lamacq denying the possibility of any such condition as hysteronarcolepsy, or epileptic narcolepsy, and attributing the condition to the derangement of function of some of the viscera. That there are, however, certain cases where the most careful examination by competent observers fails to reveal any underlying cause for the condition the work of Dana would seem to prove. I, however, believe with Ribakoff, that these cases occur in degenerate individuals, and that the recurring attacks of sleep are not the disease, but merely a syndrome occupying a prominent position among other phenomena of degeneration. The following cases illustrate to a certain extent the difference in the clinical picture in different cases, the difficulty of getting at the causative factors, and the importance of the establishment of the underlying disease in the treatment:

M. H., aged nineteen years, colored, was admitted to the clinic, complaining of paroxysmal attacks of sleep interfering with her household duties. Her family history was negative, except that her sister was also troubled with some disturbance of sleep, the nature of which was unknown to the patient. The disposition to fall asleep at irregular intervals began in her fourteenth year. Under the stress of some religious and emotional excitement she suddenly fell asleep and slept some time. She was easily awakened. Two years later, while asleep, she was suddenly awakened by a loud noise which was made to frighten her. She became very much excited, and the following day went into a sound sleep which lasted six hours. She was easily awakened during the progress of the sleep, but immediately fell sound asleep again. She considers both of these attacks natural sleep, and there is nothing in the history of the attacks to make us think otherwise. During last winter she had another sleeping attack, caused by the worry of her father's illness and the strain of nursing him. This attack lasted three hours. One month ago (May, 1899) she was sweeping the house, when an overpowering desire to sleep came over her, and she sank to the floor in a deep sleep which lasted six hours. Since then she has had similar attacks two or three times every week. The attacks come on suddenly, without any premonition except the sleepy feeling, which lasts a moment or so before she sinks to the floor and loses consciousness. There are no cries, no twitchings, no incontinence of urine or feces, and the patient lies perfectly relaxed. She is aroused with some difficulty, and afterward remembers that someone was talking to her, but seemed as if they were far away. She awakens refreshed and has no headaches or drowsy feeling. She sleeps from eight to nine hours every night, and dreams but little. Physical examination of the organs was negative, as was also the examination of the secretions. There was no trace of organic nervous disease. We thought at first that we were dealing with one of

those rare cases of narcolepsy such as Dana described, especially as a cursory examination of sensation revealed no change. The patient answered perfectly every time she was touched with the finger, and differentiated the pin-point from the head of the pin. The left ocular conjunctiva, however, was anæsthetic, and this led us to re-examine the woman more carefully for sensation. While she could tell the point of the pin, it gave no pain when penetrating the skin—*i. e.*, there was an analgesia, gauntlet in type, affecting both hands. The mucous membranes were also analgesic on the left side. By comparing the sensation on the two sides of the body she felt the pin-point and pin-scratch much plainer on the right side, although differentiating well on both sides—*i. e.*, a light grade of hypæsthesia of the left side of the body. The boundaries of these sensory changes varied somewhat in the subsequent examinations.

Here, then, is the case of a young woman who considers herself otherwise in perfect health, subject to repeated attacks of morbid sleep, over which she has no control and for which she demands relief. It is easy to understand how the slightest carelessness in methods of investigation would have left uncovered the slight but wide-spread sensory changes which stamped the case one of hysteria and excluded the possibility of it being one of true narcolepsy.

Landouzy, by an examination of the urine in a case diagnosticated true narcolepsy by a number of clinicians, discovered large quantities of sugar, and pronounced the case one of diabetes mellitus with toxic manifestations producing the morbid sleep.

While instances of prolonged natural sleep, or pseudonarcolepsy hysterica, as it is often called, are by no means common in hysteria, yet they do occur, and hysteria shares with epilepsy in furnishing us with the majority of our cases of morbid sleep. Briquet could find in four hundred cases of hysteria only three cases of prolonged sleep, and there is little evidence to show that these could be ranged under the heading of narcolepsy hysteria. They were probably cases not of true sleep, but that condition of apparent unconsciousness in which the patient retains, semi-consciously, impressions from without, and may be subsequently resurrected by hypnotism or methods of abstraction.

The following case of hysteronarcolepsy presented herself at the clinic July 28, 1899:

S. C., female, white, aged forty-two years, was admitted, complaining of prolonged sleep extending over several days at a time. She comes from a very neurasthenic stock; otherwise her family history is negative. As a child she was very nervous, but enjoyed fairly good health until her nineteenth year. In September, 1895, during a discussion at a debating club, of which she is a member, she became greatly excited. She afterward felt very drowsy, and, in spite of all her efforts to keep awake, fell into a sound sleep at the close of the meeting. She slept continuously for three days. She remembers very distinctly the visit

of the doctor to the club and his visits at her home. She also remembers being aroused to take her medicine, but retains nothing of the rest of the period of her long sleep. For three weeks following this attack she was unable to feed herself, although there was no paralysis. When she recovered sufficiently to get out of bed she was unable to walk, but recovered the use of her limbs after a few days' teaching on the part of her sister. She returned to her work of "shirt-operating," and worked three days. She became so exhausted upon the slightest effort that she gave up her place, and for the following week slept the entire time. She was aroused in the evening and kept awake for an hour or so, but was compelled to yield to the overpowering desire to sleep, and remained in deep slumber until the next evening, when the same process of arousing her and keeping her awake was gone through again. During this entire time she dreamt but little, and neither she nor her sisters were able to detect any difference between this and normal sleep. She recovered her normal tired state, but was unable to do any work on account of the exhaustion it produced. Three months later she attempted to waltz one evening, and fell asleep during the dance and sank to the floor in a deep sleep which lasted several days. A year's sojourn in the country freed her from any trouble until March of the present year. An attack of major hysteria, with screaming, laughing, opisthotonos, etc., occurred, and since that time sleeping periods of days at a time have been the rule. For the last three weeks she has slept twenty-three hours out of the twenty-four, and would remain asleep indefinitely were it not for the efforts of the family, who were afraid she would die of inanition. Her sisters pull her out of the bed and compel her to take some food, but she goes back to bed as soon as the meal is finished, and remains there until the next evening. It took at least three hours to dress to come to the hospital. She would fall asleep in the process of putting on a garment, and would have to be awakened to complete her dressing. There is no organic disease, but her general nutrition is very low, and she is thirty-four pounds below her best weight. The muscles are flabby and wasted; the tongue is coated, the breath foul, and constipation is marked. The skin is sallow and covered with acne, and she has a very melancholic expression. Reflexes are active; no ankle clonus, and there are no disturbances of sensation. She always feels tired, and has "never enjoyed herself for five minutes that did not require several days' sleep for recuperation."

Besides the hysteria in this case we have the neurasthenia and possibly a beginning melancholia as factors in the production of the sleep. There can be little doubt that the woman's present condition depends as much on the neurasthenia as the hysteria, but the history of the case demonstrates that the onset of the trouble was hysterical in nature. Why we should differentiate the marked sleep of hysteria from the lethargy of hysteria and hysterical unconsciousness is not distinctly clear, as they are all manifestations of the same disease and demand the same treatment. The French school, however, tells us that we should not confound these several conditions. Hysterical sleep, or hysterical unconsciousness, according to Charcot, is an attack of hystero-epilepsy modified—an equivalent to the grand attack with which it alternates.

The patient retains a "souvenir" of what passes on about her, and the muscular twitchings, subdued cries, irregularities in respiration, etc., indicate the suppressed motor elements of the grand attack. In hystero-narcolepsy, on the other hand, the patient is lost in the forgetfulness of natural sleep, and the muscular twitchings, irregularities of respiration, etc., are wanting.

In many of these cases the period of sleep is filled with vivid dreams. In this respect they resemble the sleep of neurasthenia, with which, as in the case of S. C., the hysteria may be associated. In such cases an already exhausted nervous system attempting to recover from an expenditure of energy which it can ill afford seems to be a rational explanation for the prolonged sleep. The treatment of such cases is to change the vicious, deranged metabolism of the individual by eliminating the element of copræmia from the overloaded bowel; to change the tone of the muscles, and to correct, as far as possible, by massage and graduated exercises, the all-important muscle-metabolism; and, finally, by complete rest and judicious feeding, to build up the entire system and with it the exhausted and deranged nervous system. There is no reason why the patient should not sleep; but this need not interfere with the massage and the feeding of the patient.

The differential diagnosis of the hysterical states detailed above is not of so much importance as the differentiation of hysterical conditions, as a class, from the other conditions of the organism which produce morbid sleep. These may be divided into two classes:

1. The epileptoid sleeping states, such as *petit mal*, epileptic equivalent, etc., and

2. The morbid sleep depending on toxæmic states and disturbed cerebral circulation and nutrition, which cannot very often be separated from each other. To this class belong the somnolence of uræmia, cholæmia, etc.; of cardiac and pulmonary diseases; of organic brain disease and arterio-sclerosis; of toxic products from without, as opium, etc.; and, finally, the cerebral exhaustion of typhoid and some blood diseases.

The epileptoid sleeping states are easily recognized, as a rule, by the sudden onset of the sleep, often with an aura; the complete unconsciousness during the attack, and the usual sequelæ of epileptic occurrences, such as headache, confusion, etc. The following is a case of *petit mal*:

M. G., male, aged eighteen years, developed at puberty peculiar attacks, as follows: After awakening from a sound sleep he will walk a few steps and fall to the floor unconscious. He remains unconscious several minutes, regains his feet and walks for a few steps, and falls again unconscious; this is repeated fifteen to twenty times. There are no auræ, no twitchings, no headaches. These attacks lasted three years, when he developed typical *grand mal*, and lately he voids his urine in both attacks.

The somnolence of uræmia, etc., develops so late in the disease that the routine clinical examination reveals the underlying cause. Somnolence, stupor and coma are frequent symptoms of organic brain disease, but any of these symptoms occurring early and occupying the foremost place in the clinical picture should suggest the gray areas surrounding the third ventricle as the seat of the lesion.

The following case illustrates the intimate relation existing between the toxæmic states and states of disturbed cerebral nutrition and circulation, and the difficulty in separating them:

O. M., aged sixty-two years, pavior, suffered from the toxic effects of tainted meat one year ago; gastro-intestinal disturbances, vertigo, and later a severe multiple neuritis were the symptoms presented. He still suffers from the effects of the multiple neuritis. For the last two months he has developed a disposition to fall asleep at all times and in all places, that alarms himself and his family. Every time he remains quiet a few minutes he falls asleep and sleeps from ten to fifteen minutes. After sleeping eight hours during the night he would fall asleep after breakfast if he remained quiet. Station is good; gait is senile and unsteady. There is hypertrophy of the heart, arterio-sclerosis, and the urine contains narrow, granular casts. An encephalitis affecting the central gray matter, and caused by the meat poison, could cause such symptoms, but we would expect other evidences of brain-disease than the vertigo. We would, at least, expect some nuclear involvement of the cranial nerves. Eye-tire could hardly cause such symptoms, as he rarely reads or uses his eyes for fine work. Defective cerebral nutrition from arterio-sclerosis, assisted by some uræmic poison, could, and probably does, cause the peculiar recurrent periods of sleep in this case.

I have found nothing in my studies of sleep and its disturbances in this clinic to support the idea that the condition known as narcolepsy is a distinct neurosis or disease. In the only autopsy report out of eighteen cases collected by S. Weir Mitchell there was simply "no lesion." In Dr. Mitchell's case he found "starch-corpuscles in the ventricular serum and in those portions of the gray matter submitted to examination." I feel quite certain that a microscopical examination of the brain of such cases of prolonged sleep as that lately reported by Skerrit and Stewart, where the patient recovered from a sleep of fifty days with inco-ordination and other symptoms of brain-lesion, would reveal cellular changes.

The sleeping sickness of the negroes of Africa has not been considered in this paper, because it is such a rare occurrence in this country. It is due to a filaria, and probably depends on some poison generated by it in the blood.

I am indebted to Dr. W. G. Spiller for the privilege of reporting the cases presented in this paper from his clinic at the Philadelphia Polyclinic.

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A CRITICAL SUMMARY OF LITERATURE

ON

THE INFLUENCE OF HEREDITY ON DEAFNESS.*

BY W. SCHEPPEGRELL, A.M., M.D.,

PRESIDENT OF THE WESTERN OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL ASSOCIATION, ETC., NEW ORLEANS, LA.

THE subject of heredity as applied to deafness is worthy of earnest investigation not only because the subject itself is of importance, but also on account of the lack of unanimity of the views on this subject. Not only is there a wide divergence of opinion as to the influence of heredity upon deafness, but even the reports and statistics which have been published, and which form the foundation of these opinions, vary

* Read before the Louisiana State Medical Society, New Orleans, May 18, 1899.

within such extensive limits that they cannot be explained by ordinary social environments or geographical distribution. As illustrating this difference of opinion, Bell,[1] who has contributed much to this subject, believes that the evidence which he has collected shows a tendency to the formation of a deaf variety of the human race in America, while the Commissioners of the Irish Census of 1881, in making their report, state that "it appears evident that the question of deaf-mutism in parents has no influence in propagating the defect." Between these two extremes as to the influence of heredity stand many authors, some of whom incline to one and some to the other opinion, so that the systematizing of this subject presents no little difficulty.

The relation of deafness as an essential factor in deaf-mutism is not generally understood, and a considerable proportion of the laity believe that mutism is due to some defect in the organs of speech. It is not an uncommon occurrence to have a child presented to have its mouth and throat examined, the parents being under the impression that there is some defective development or paralytic condition of these parts, when the real cause is in the auditory apparatus. These persons are slow to realize that hearing is essential in the normal development of speech, and that the child could not be expected to repeat sounds which it had never heard.

An examination of the literature previous to the latter part of the sixteenth century indicates that the relation of deafness and mutism was not realized, and that deafness in deaf-mutes was considered a complication or a condition arising from the same cause as the mutism. The first indication that the relation of cause and effect existing between deafness and mutism was understood is shown in the writings of Pedro de Ponce,[2] in the latter part of the sixteenth century. As illustrating the important bearing which the knowledge of the true nature of a disease or a defect has on its treatment, De Ponce no sooner realized that mutism had for its *raison d'être* the inability to hear, when he initiated methods for the development of speech in these cases, and with some satisfactory results.

Previous to this period the writings indicate that no relation was suspected between the absence of speech and of hearing in the deaf-mute. So astute a philosopher as Hippocrates believed that mutism was due to the fact that the patient could not use his tongue for articulate speech and Aristotle found in the accompanying deafness an affection of the ear dependent upon the same cause as the defect of speech, their relationship as cause and effect remaining unsuspected.

While some attention was given to this subject in the seventeenth and eighteenth centuries, it is only comparatively recently that any considerable interest has been manifested and any attempt made to investigate the subject on a scientific basis. Among those whose writings have

been of value in this connection may be mentioned Itard,[3] Ménière,[4] E. Schmalz,[5] Wilhelmi,[6] Wilde,[7] Meissner,[8] Toynbee,[9] Hartmann,[10] Hedinger,[11] and H. Schmaltz,[12] the majority of these having investigated the subject more from the stand-point of the teacher of deaf-mutes than that of the otologist.

In studying the subject of deafness as applied to heredity, it is well to define the limits within which the term deafness is here used. In some cases the deafness is so complete that no sounds whatsoever are heard, the proportion among the congenitally deaf having been estimated at about 39.7 per cent., and among those who have acquired deafness since birth about 48 per cent. Certain loud noises, such as the firing of guns, etc., may be perceived by these persons, giving the impression that they have been heard. The concussion in these cases, however, is so great that the vibrations may be perceived by the tactile sense of the skin, especially since in the deaf and blind the unaffected senses are usually more acutely developed. It has also been shown by Egger, in a recent communication before the Société de Biologie,[56] that sonorous waves may be transmitted by the nerves of general sensibility. This faculty, which is usually but little developed in the normal individual, is susceptible to education, and becomes quite marked in the deaf-mute who is totally deaf. Egger claims that this transmission is not effected by the superficial or cutaneous nerves, but rather by the musculoperiosteal terminations of the deeper nerves.

In deaf-mute institutes there are many cases in which noises of greater or less intensity may be heard, and yet in which the hearing is so defective that the child fails to develop speech in the normal manner. The term "deafness," therefore, as used in this article, will be limited to cases in which the ordinary methods of teaching speech are not applicable.

In considering the subject of deafness two classes are presented—that of congenital and that of acquired deafness. The former refers to abnormalities in the function of hearing existing at birth; that is, during the development of the fœtus. These abnormalities have been demonstrated by post-mortem examinations. Congenital deafness, however, is by no means of common occurrence, and many of the cases are so considered simply for lack of sufficient evidence to the contrary. As opposed to this, however, there are some cases of deafness, really of congenital origin, which are attributed to disease, owing to the fact that parents are loath to admit that the child was born with some abnormality.

While the statistics of this subject vary within considerable limits, the average of the reports of the various institutes for the deaf and dumb show that in two-thirds of the entire number the deafness was acquired, leaving one-third as being congenitally deaf. In America

and Great Britain the number of congenital cases has been estimated to be about one-fourth.[13] The real proportion of acquired cases, however, is probably greater, as cases in which the disease causing the deafness cannot be ascertained are entered in the list of congenital deafness. In many cases, however, a disease in infancy appears of no great intensity, and yet wreaks such havoc on the delicate auditory apparatus that the hearing is destroyed. If this takes place before the child has learned to speak, and especially before the faculty of attention is well developed, the effect on the ears, if unattended by some external signs, may be unobserved, and the case considered as one of congenital deafness.

In a series of cases examined by Lemcke[14] deaf-mutism was acquired in 55 per cent. of the total number. Roosa[15] estimates this number at 50 per cent., while Mygind,[16] from an investigation of 210 cases, found that 110 were acquired and 54 were congenital, the remaining cases being uncertain. The report of the Michigan Asylum for the Deaf and Dumb, at Flint, fixes the proportion of congenital deafness much lower, as it shows that in 75 per cent. of the cases the deafness was acquired.

That many cases of supposed congenital deaf-mutism are due to pathological processes in infancy is demonstrated by the fact that in some of these cases perforations, adhesions and other sequelæ of pathological conditions exist, showing that the deafness was acquired. Politzer[17] found this to be the case in many instances of supposed congenital deafness, and Schmalz,[5] in a series of investigations, found that in 16.2 per cent. of the cases supposed to be of congenital origin, objective changes in the hearing apparatus could be shown. As further illustrating the difficulty in deciding this point, Schmalz found in 39 per cent. of the cases of acquired deaf-mutism no visible trace of any affection of the ear. While the probability is that in these cases the pathological process affected some part of the auditory apparatus, such as the cochlea or auditory nerve, the evidence of which does not appear in the ordinary physical examination, still it may also indicate that the deafness was really of congenital origin.

The difficulty of distinguishing between congenital and acquired deafness is, moreover, aggravated by the fact that the lesion resulting in the loss of hearing may be caused during birth, especially when this is accompanied by instrumental delivery. While the number of these cases is probably small, their actual existence has been demonstrated by Lent[18] and Wilhelmi.[19]

The report of cases of deaf-mutes, showing the proportion in which no hearing could be demonstrated, presents even a greater divergence than the statistics of congenital and acquired deafness. In a series of most careful tests of the hearing of one hundred deaf-mute children

Urbantschitsch[20] found only three who were absolutely deaf. Other authors, however, have found the percentage of the totally deaf much greater. Hartmann,[10] for instance, estimates this at 16.2 per cent., Uchermann[21] at 30.3 per cent., while Lemcke[22] found in the institute which he examined 20.8 per cent. entirely unresponsive to the tests which were used. Bezold[23] found the proportion even much higher, as among seventy-nine deaf-mutes whom he examined forty-eight were apparently totally deaf.

This striking difference in the estimates of the totally deaf, as compared with deaf-mutes in whom there is still some remnant of hearing, can be accounted for only by the fact that different methods were used in testing these cases. This illustrates the necessity of having uniform standards of testing, which should apply not only to the intensity of the sound, but also to the quality and pitch, as each of these is important in these cases.

The greatest care, patience, and perseverance are required in making these tests, as many of the subjects are of an age when their natural intelligence is not yet sufficiently developed to be of any assistance. It is usually necessary to divert the child in some manner, so that when the test is applied the fact that it is heard is shown by the child turning toward the direction of the sound. The accuracy of the test will therefore vary inversely as to the interest that the child manifests in the object which is diverting its attention. Even if there is some remnant of audition, the fact that this function has been lying dormant, and has not been exercised, has an important bearing. The large proportion of deaf-mute children in whom some remnant of hearing could be demonstrated, reported by Urbantschitsch, is no doubt due to the fact that at the very earliest age he commenced the exercise of the hearing by various means, so that when the tests were made the auditory nerve responded much more rapidly than would have otherwise been the case.

The tests ordinarily applied vary considerably: Hartmann used a table-gong; Toynbee, the clapping of the hands; Hedinger, Galton's whistle, and Urbantschitsch, a harmonica with a range of five and a half octaves.

The tests which I have found the most efficacious in these cases consist of the following: A snapper similar to that used for teaching pupils in telegraphy, but of a larger size; a whistle of high pitch and containing a ball to change the vibrations; a series of automatic bells, varying in pitch and made somewhat like those used by the bicyclist. With these tests I have been able to demonstrate hearing in cases that have been found totally deaf by other aurists. The variety of tests given above, however, explain to some degree the difference in the reports of the proportion of the totally deaf to those in whom there is a remnant of hearing.

When deafness is congenital, or acquired at an age when the child has not yet learned to speak, mutism necessarily follows unless one of the artificial methods of teaching speech is practised. Even if the child has acquired some rudimentary words, as "mamma" and "papa," these sounds are gradually forgotten. In fact, it may be stated that if the deafness develops before the age of seven the speech already acquired gradually becomes less fluent, rougher and less distinct, and, unless educational methods are used to overcome the tendency, mutism will ultimately result.

Early infancy is a predisposing factor in the development of acquired deafness. The delicate mechanism of the hearing apparatus easily falls a victim to the many diseases to which infancy is subject, and statistics show that about one-half the number of cases in the institutes for the deaf and dumb develop before the fourth year.

Of 503 cases of deaf-mutes examined by Wilde[24] the deafness appeared in 120 before the third year, the majority of these during the second. It appeared between the third and fourth year in 129 cases; in the fourth in 76 cases; in the fifth in 38; in the sixth in 36; in the seventh in 32; in the eighth in 21; in the ninth in 11; in the tenth in 15; between the tenth and fifteenth in 33; and after the fifteenth year in 12 cases.

Among the congenital abnormalities which may result in deafness are malformations of the labyrinth, as the absence of the fenestral openings, defective formation of the vestibule and of the semi-circular canal or cochlea, defect or excess of otoliths, absence or lack of continuity of the auditory nerve, absence of the external auditory canal; or there may even be anomalies in the development of the nervous centres of the organ of hearing. There may have been inflammation of the labyrinth or middle ear during uterine life,[25] and even meningitis may develop at this period, destroying or injuring the function of hearing.[26] It may also, in exceptional cases, be due to atrophy and degeneration of the acoustic nerve, as determined by Mygind.[27]

In the earliest embryonic life the drum membrane is entirely absent, closure finally taking place at the upper part. An arrest of development may leave an opening at this point similar to the abnormality shown in cleft palate and harelip. While this alone would be insufficient to develop total deafness, still it leaves the middle ear exposed to inflammatory processes, lessening its resistance and making the patient more liable to diseases affecting the hearing.

Among the most important causes of acquired deaf-mutism are pathological conditions of the labyrinth or auditory nerve, due to cerebral disease, meningitis or epidemic cerebro-spinal meningitis, hydrocephalus,[23] inflammation of the labyrinth, syphilis, traumatism, mumps,[28] scarlet fever, enteric fever, typhus fever,[30] measles and diphtheria.[31]

Ordinary pathological conditions of the middle ear, resulting from catarrhal or purulent processes, are usually not so violent in their effects on the function of hearing as to cause total deafness. Moos[32] claims that inflammation of the middle ear, resulting in suppuration or adhesions and ankylosis of the ossicular chain, is an important factor; but, as already stated, total deafness resulting from this cause is extremely rare.

As illustrating the various causes to which deafness may be due, the following report of 546 cases examined at the Pennsylvania Institute for the Deaf and Dumb[33] will be of interest:

Scarlet fever	78	Cholera infantum	3
Cerebro-spinal meningitis	44	Diphtheria	2
Meningitis	39	Enteritis	2
Measles	19	Whooping-cough	2
"Colds"	15	Rhachitis	1
Convulsions	12	Smallpox	1
Traumatism	14	Shock	1
Otitis media	11	Mumps	1
Typhoid fever	8	Bronchitis	1
Spinal meningitis	8	Sunstroke	1
Pneumonia	4	Croup	1
Catarrhal fever	4	Eczema	1
Teething	3	Unrecorded	8
"Malaria"	3	Unknown cause	58
Black fever (?)	3	"Deaf from birth"	200

It will be noted that two hundred of the cases are reported as "deaf from birth." Some of these, however, may be cases of acquired deafness; for if the hearing is lost during the course of some illness before speech has developed, this point is not always easy to determine. It sometimes happens that during an attack of one of the exanthemata or other affections the symptoms presented in the little patient may appear comparatively slight; but the tender aural apparatus may be, nevertheless, affected to such a degree that the function of hearing is destroyed. As already stated, if this should occur before the development of speech the deafness will very probably be considered of congenital origin.

It should not be forgotten, however, that the inverse of this may also take place. If a child is born deaf and has an attack of scarlet fever, diphtheria or other disease which may affect the hearing apparatus, the deaf-mutism observed in later years may be ascribed to this as the most probable cause, whereas the case is really of congenital origin. While this is probably of rare occurrence, its possibility should not be overlooked in the tabulation of these cases.

As regards the proportion of the deaf and dumb to the population in general, statistics vary within considerable limits. In a paper read before the American Association for the Advancement of Science, Alexander G. Bell made the assertion that there was one deaf-mute to every

1500 of the world's inhabitants, while Hartmann[34] places the proportion as one to every 1414. The proportion in different countries also seems to vary, statistics showing that in Great Britain and Ireland there is one deaf-mute in every 1636;[18] in France, one in 1672;[35] in Prussia, one in 1730;[36] in North America, one in 1251.[37] According to George Mayr,[38] among 206,000,000 persons there were 152,751 deaf-mutes, the proportion varying considerably in different countries, the lowest average being found in the Netherlands, where the proportion is 3.35 per 10,000, while the highest is in Switzerland, 11.80 per 10,000. According to this author, the average of all countries is 6.72 per 10,000 inhabitants.

The following table[39] shows the number of deaf-mutes in different countries, the proportion of deaf-mutes to 10,000, the number of male and female deaf-mutes respectively, the number of female deaf-mutes per 10,000, and the number of women per 10,000 of the population:

Country.	Year.	Total population.	Deaf-mutes.	Deaf-mutes per 10,000.	Male deaf-mutes.	Female deaf-mutes.	Female deaf-mutes per 10,000.	No. of women per 10,000 of whole population.	Bibliographic references.
Switzerland	1870	2,669,147	6,544	24.5	.....	.....	.....	.....	38
Austria	1880	22,144,244	28,958	13.1	15,935	13,023	8.2	10.47	40
Hungary	1881	15,642,102	19,874	13.7	10,589	9,255	8.3	10.28	41
Baden	1871	1,461,562	1,784	12.2	942	842	8.9	.....	38
Alsace-Lorraine	1871	1,549,587	1,724	11.1	977	747	7.6	.....	38
Würtemberg	1861	1,720,708	1,910	11.1	1,019	891	8.7	.....	38
Sweden	1880	4,565,668	4,834	10.6	2,681	2,153	8.0	10.61	42
Prussia	1880	27,279,111	27,794	10.2	15,168	12,626	8.3	10.33	43
Finland	1880	2,060,782	2,098	10.2	1,183	915	7.7	.....	44
Norway	1886	1,922,105	1,826	9.5	1,029	797	7.7	10.61 (1880)	45
Bavaria	1871	4,863,450	4,381	9.0	2,252	2,129	9.4	.....	38
Ireland	1881	5,174,836	3,993	7.7	2,163	1,830	8.7	10.45	46
Portugal	1878	4,161,980	3,109	7.5	1,799	1,310	7.3	10.91	47
Greenland	1879	1,679,551	1,085	6.5	.....	.....	.....	.....	48
Denmark	1886	1,969,039	1,255	6.4	645	610	9.5	10.35	49
Saxony	1880	2,972,805	1,747	5.9	941	806	8.6	10.57	12
France	1876	36,905,788	21,395	5.8	11,460	9,935	9.7	10.09	50
Scotland	1881	3,933,300	2,142	5.7	1,149	993	8.6	10.77	51
Italy	1881	28,461,681	15,300	5.4	8,707	6,593	7.6	.....	52
England and Wales	1881	25,974,439	13,295	5.1	7,111	6,184	8.7	10.57	53
Spain	1877	16,623,384	7,629	4.6	4,625	3,004	6.5	10.44	54
Belgium	1875	5,336,185	2,280	4.3	1,208	1,072	8.9	9.95 (1866)	38
Holland	1879	3,575,080	1,199	3.4	629	570	9.1	10.23	38
Total	.....	222,646,584	176,156	7.9	92,212	76,315	8.27		
United States	1880	50,155,783	33,878	6.8	18,567	15,311	8.2	.....	55
Total	.....	272,802,317	210,034	7.7	110,779	91,626	8.271		

From these tables it appears that deaf-mutism is more common in the male sex, all statistics agreeing on this point. While this has been explained in various ways, it has not been satisfactorily accounted for. A noticeable feature is that the ratio for the United States is placed

at 3.82 per 10,000, a proportion of one to 2617 inhabitants, whereas the majority of statisticians place this proportion much higher, placing it at one in 1470,[39] and another at one in 1251.[37]

A careful study of these tables, while showing that the average number of deaf-mutes is 7.7 per 10,000 for the total inhabitants of the countries listed in the tables, the proportion for the individual countries varies from 3.4 per 10,000 (Holland) to 24.5 per 10,000 (Switzerland), the remaining countries ranging between these two extremes. So great a difference is difficult to explain on any scientific basis, and the great discrepancy must be due to some defect in the method of collecting these statistics, as it is improbable that such a difference is due to climatic conditions or social environments.

Locality, however, seems to be of some importance in deaf-mutism as well as in certain diseases. It has long been known that cretinism is of common occurrence in mountainous regions, and deaf-mutism in these localities is also frequent. Ménière[57] refers to several places in the canton of Berne, Switzerland, where deaf-mutism and cretinism are found in a large proportion of the population. In his investigation of this region Mitchell[58] also found this to be the case.

The influence of heredity in the transmission of deaf-mutism has received considerable attention, but the opinions of various authors on this subject are by no means unanimous. This is not surprising when we find that many of the authors have not discriminated between congenital and acquired deafness, and that much of the material collected has been obtained from the relatives and friends of the deaf-mutes, the probability of error in such evidence being well understood. Deafness, moreover, has frequently been considered a malady by those who have investigated this subject, whereas it is simply the result of certain pathological or abnormal conditions, which may vary within considerable limits.

That heredity has a certain influence in these cases is probable from analogy, as the inherited predisposition to other maladies, such as tuberculosis, lithiasis and the various neuroses, is generally admitted. It is frequently observed, moreover, that certain formations of the external ear are found in the same family, such as abnormal flatness of the cartilage, a pointed instead of the usual rounded helix, and other peculiarities.

Deafness is sometimes the result of catarrhal disease of the nose and throat, and a predisposition to such diseases in certain families is by no means unusual. Recently, I found four out of a family of six children affected with a severe form of fetid atrophic rhinitis, and instances of this kind are not of infrequent occurrence.

Catarrhal diseases of the nose and throat as an etiological factor in deafness are well recognized. The tendency to develop certain ear

diseases in a family in which some ear affection exists is of common occurrence. This predisposition is sometimes transmitted potentially, as the parents may appear perfectly healthy, but the disease may develop in one of the grandchildren. Although transmitted in this manner, the influence may be so strong that several of the grandchildren may develop the aural affection in succession. It is not improbable in these cases, however, that the predisposition in one parent is aggravated by a similar tendency in the other. Mitchell[59] even showed that this predisposition may be transmitted through three generations, and refers to a case in which neither parents nor grandparents were deaf, and yet the predisposition to deaf-mutism was transmitted through them potentially.

The subject of heredity in connection with deaf-mutism has been discussed in an interesting brochure on the subject of *Marriages of the Deaf in America*, by Edward Allen Fay, of Washington, D. C., and recently published by the Volta Bureau. The conclusions advanced in this communication are based on statistics which have been tabulated in the most careful manner and obtained from all available sources. It appears from these statistics that marriages of the deaf are somewhat, but not much, less productive than other marriages, this being more marked in the congenitally deaf.

While it is generally admitted that marriages of deaf persons, one or both partners being deaf, are far more likely to result in deaf offspring than those in which both of the partners are hearing persons, it is shown in these tables, as well as in those of other investigators, that marriages of deaf persons are far less likely to result in deaf than in hearing offspring, not more than 25 per cent. of the children being born deaf, thus illustrating the law of heredity that the offspring tend to revert to the normal type.

In a large number of marriages of deaf-mutes both of the partners are deaf, this probably being due to a feeling of fellowship among those so afflicted, the segregation of deaf-mutes in schools, etc. An interesting observation which appears to be shown in these tables is that in marriages in which both partners are deaf the percentage of deaf offspring is smaller than in marriages in which only one of the partners is deaf. Attention has already been called to this fact by former investigators without, however, arriving at any satisfactory explanation. Darwin, for instance, in commenting upon Sedgwick's suggestion on this subject, states that "in the present state of our knowledge it is better to look on the whole case as simply unintelligible." Fay,[60] however, in explanation, very properly calls attention to the fact that the marriage of congenitally deaf persons is not necessarily a union of like with like from a physiological stand-point.

In a large number of cases of deaf-mutes, however, it is not improbable that a considerable percentage suffer from similar lesions, and we

would therefore expect a larger number of deaf offspring from the marriages of deaf-mutes than where only one parent is so affected. This, moreover, has been found to be the case by a number of other investigators, and in 724 marriages collated in the *Münchener medicinische Wochenschrift*[61] only 1.3 per cent. of the 1550 children were deaf and dumb, while in 104 marriages in which both parents were deaf-mutes the percentage was 4.6. In a series of investigations by Mygge[62] it is shown that in cases in which only one parent was a deaf-mute 6.8 per cent. of the offspring were deaf-mutes, while in cases in which both parents were deaf-mutes the percentage was 13.3, or almost twice as high.

As has been already stated, deafness is not a disease but simply a symptom which may be due to many different and unconnected pathological conditions. One person may be deaf from an abnormality of the auditory nerve and another from some defective development of the cochlea, and the marriage of these two does not necessarily increase the tendency in the offspring to the same degree as if they both suffered from similar defects.

The influence of heredity in these cases is considered so strong by Bell that he believes there will be an evolution of a distinct race of deaf-mutes. The majority of investigators, however, do not agree with this view. Quite the reverse of this is the report of Mathison[63], who examined 661 mute children in the Ontario Institute for the Deaf and Dumb at Belleville. He states that he is acquainted with the parents of about three hundred of the children, and has made inquiries during the last five years of many of the others. Up to that time he was unable to find that any of the parents were or are deaf and dumb, although a few of the grandparents were mutes. He therefore believes that the instances of hereditary deafness are few in proportion to the number of deaf and dumb persons.

On the other hand, Urbantschitsch[28] believes that heredity is an important factor in congenital deafness, and that its influence, even if not shown in the direct descent, may be transmitted potentially to a third or later generation. The statistics of the Pennsylvania Institute for the Deaf and Dumb,[64] covering a period of ten years, have been investigated by a special committee, and show that 240 families had during this time sent children to this institute. In six of these families the parents were deaf, in five congenitally so; and the total number of deaf children sent by deaf parents was ten, four of these being deaf from accident or disease. In the cases of the graduates of this institute twenty couples have married, sixteen of whom were known to be congenitally deaf. At the time of this report twenty children had been born to these couples, two of the children being deaf. While this number is comparatively small, it shows that deaf-mutism appeared in 10 per

cent. of the children of these marriages, whereas the average proportion of deaf-mute children born of parents not so affected is not more than one to 1500.

The tables furnished by Fay[60] appear to show that the proportion of deaf offspring is less when both partners are adventitiously deaf than when one is so and the other a hearing person. The percentage of marriages resulting in deaf offspring, and the percentage of deaf children born therefrom, is almost invariably the highest when both parents had deaf relatives, next when one had deaf relatives, and least when neither had deaf relatives. This is in conformity with the view of Bell, who maintains that "an hereditary tendency, as indicated by the possession of deaf relatives, is the most important element in determining the production of deaf offspring," and that "it may even be a more important element than the mere fact of congenital deafness in one or both of the parents."

Fay even goes further, and states that while congenital deafness may be considered as a *prima facie* indication of the liability to deaf offspring, it should not be accepted as conclusive indication of such liability, for where congenital deafness is unattended by the possession of deaf relatives the liability, if it exists at all, is very slight and should not be regarded as a bar to marriage. He maintains that persons having deaf relatives are as liable to have deaf offspring as deaf persons having deaf relatives, supposing each to marry deaf partners who have, or each to marry deaf partners who have not deaf relatives.

This view, however, cannot be accepted without reserve, as the actual existence of deafness, in addition to having deaf relatives, must indicate a stronger predisposition in the individual and a greater probability of transmitting it to his or her offspring than the mere existence of deaf relatives. It must be admitted, on the other hand, that deaf-mutism is not hereditary in the ordinary sense of the term, but only in the widest sense in which we apply it in consequence of several members of the same family, their cousins or other collateral branches, being similarly affected. The disease in the offspring is the expression of some unrecognized but abnormal condition of one or both of the parents, and the existence of deafness in several members of the family must therefore be considered a strong predisposing factor in the development of this condition.

It has been maintained by some authors, such as Mygge,[62] that deaf-mutism is more frequently transmitted by the father than the mother, but this is not in conformity with statistics obtained from other sources, and the reverse is the case in the tables of H. Schmaltz.[12] Attention has been called to a curious fact that in some cases only the male,[65] and in others only the female[66] members of the family were deaf. Wilde[7] reports a number of cases in which every second or third child was deaf.

The importance of consanguineous marriages in deaf-mutism has been differently estimated by authors who have investigated this subject. Boudin[67] believes that 25 per cent. of the cases of deaf-mutism are due to this cause, while Hartmann[68] places it at 8.1 and Mitchell[69] at 6 per cent. Attention was first called to the importance of consanguineous marriages by Ménière[70] and Puybonnieux,[71] and while their claims have not been fully substantiated by subsequent writers, the majority of these believe that consanguineous marriages furnish a decided predisposing element in congenital deafness. The statistics collected by Wilde[7] demonstrate this, and the report of the Pennsylvania Institute for the Deaf and Dumb[64] shows, among 546 pupils, 31 instances of blood relations in the parents. Among 336 cases examined by Hartmann,[72] 7 per cent. were of consanguineous marriages; but Schmaltz[12], in the statistics collected from Saxony, estimates a much greater proportion.

The frequent occurrence of all forms of nervous diseases among children of consanguineous marriages is well recognized, and deaf-mutism is sometimes one of these manifestations. This has been shown in a most interesting manner by Loubrieu[73] and Patterson,[74] the latter maintaining that when marriages of near relatives are not followed by deafness in the immediate offspring the result is, nevertheless, a tendency to deterioration of the constitution of the offspring, so that deafness may appear in a successive generation.

In regard to the influence of consanguineous marriages of the deaf, Bell[1] believes that a person with acquired deafness who has no deaf relatives will probably not increase his liability to have deaf offspring by marrying a blood relative. This opinion, however, is open to serious discussion, as acquired deafness, in the majority of cases, indicates a lack of resistance of the organs of hearing of the individual so affected which would probably be aggravated by a marriage with a blood relative in whom the same condition may be potentially present. He is undoubtedly correct, however, when he states that a person congenitally deaf, even without deaf relatives, will probably increase his liability to have deaf offspring by marrying a blood relative, and that where there are deaf relatives a consanguineous marriage will increase the liability to deaf offspring, especially if the relative should happen to be on the deaf side of the family.

The influence of consanguineous marriages does not only tend to increase the number of deaf offspring, but the tables of Fay[60] show that the number of deaf offspring resulting from such marriages is nearly six times as great as in marriages of persons not so affected.

All statistics agree in showing that the number of cases of deaf-mutism resulting from the marriages of deaf-mutes who are not blood relatives is not excessively large, but they also prove that where there

are consanguineous marriages this tendency to deaf offspring is decidedly aggravated. Even where no hereditary taint can be traced the marriage of blood relations is sometimes followed by deaf-mute offspring, and in the majority of cases in which the cause is not disease or heredity, this has been found to be the cause. In localities where intermarriage is of frequent occurrence the proportion of deaf-mutes is far above the average. In Alia, Italy, where intermarriage is of common occurrence, the number of cases of deaf-mutes, as well as of idiocy, epilepsy and other nervous affections, is abnormally high. In France, where 2 per cent. of the marriages are of blood relatives,[75] 28 per cent. of the cases of deaf and dumb at Paris, 25 per cent. at Lyons, and 30 per cent. at Bordeaux are the direct issue of such marriages. In Prussia, where the proportion of consanguineous marriages is 0.8,[76] there were 156 cases, or 12.9 per cent., among 1210 deaf-mutes who were the offspring of consanguineous marriages; while among 1551 cases of acquired deafness there were only 47, or 3 per cent., who were the result of such marriages. Of the deaf-mutes at Vienna,[77] 25 per cent. were the issue of blood relations. These statistics show that consanguineous marriages have a marked influence on the propagation of deaf-mute offspring not only where the parents are deaf-mutes or have a tendency to deaf-mutism, but even in cases where there appears to be no such hereditary predisposition.

In cases in which deaf-mutism cannot be traced to heredity or to consanguineous marriages, it may be the expression of an abnormal constitutional condition in the parent. It is a phase of physical degeneration which may appear in families suffering from scrofula, tuberculosis, mental or nervous diseases, syphilis or alcoholism. Social environment is also of importance in this connection, as has been advocated by Ménière.[70] Schmaltz shows the association of epilepsy, idiocy, insanity and other mental manifestations of nervous diseases in the families of deaf-mutes. Several cases of albinismus associated with deaf-mutism have been reported by Dahl,[78] though his observations appear to be unique in this direction. Cretinism is not infrequently met with in the deaf-mute, and Huth[79] has shown that a large proportion of deaf-mutes are found in regions where goitre is prevalent. In some of the cantons of Switzerland the proportion of the deaf and dumb to the population is as high as one in 206, which is almost eight times the general average, as shown by the statistics already given.

The association of ear disease in the families of deaf-mutes has not been found to be very large, according to the majority of investigators, Wilhelmi,[80], Falk,[81] Moos,[82] Schmaltz,[12] and Mygind[83] placing the average at a very low figure. Schwartze,[84] however, believes the opposite to be the case. No doubt ear diseases among the families of deaf-mutes is much more prevalent than would be inferred from the reports of the

various institutes for the deaf and dumb, as most of their information regarding this subject has been obtained from the friends of the deaf-mutes, who would not be likely to report mild cases of ear disease unless attended by a considerable degree of deafness.

As far as influence of sex is concerned, boys appear to be more frequently affected than girls, the proportion of male to female, according to Wilde, being 100 to 74.5; Hartmann, 100 to 85.1; Schmaltz, 100 to 85.6. Large families have been considered a predisposing factor by Lemcke,[85] especially when the children are born in rapid succession. The age and difference of ages of the parents have been considered in the investigation of this subject by Ménière,[70] who was the first to call attention to this point. He claimed that the parents of deaf-mutes were frequently very young, and that the father was oftener younger than the mother. These statements, however, have not been accepted by subsequent observers, and Puybonnieux[71] found 70 per cent. of the parents of deaf-mutes to be over thirty years of age.

As a preventive measure against the increase of deaf-mutism, deaf-mutes should be separated as much as possible one from the other, as this association encourages marriage, by which the tendency to deaf-mutism is increased. As the oral method is now more generally taught, deaf-mutes who have acquired this are no longer limited to signs, which practically cuts them off from society. As these are no longer isolated as formerly, the inducement to marry partners similarly affected is not therefore as great as was formerly the case. It has been shown by Fay,[60] however, that, other things being equal, there is a greater possibility of happiness in marriages of the deaf in which both partners are so affected.

The marriages of deaf-mutes between whom blood relation exists, even to a distant degree, should be strongly interdicted, as the possibility of deaf offspring is exceedingly great. The ordinary dangers of consanguineous marriages are aggravated in cases in which there is deafness on one side, as statistics show a tendency to deaf offspring in these cases. Although the majority of writers appear to consider acquired deafness a much lesser evil than congenital in the transmission of deafness, it undoubtedly shows a predisposition toward deafness, so that it differs from the latter only in degree.

Much has been done to ameliorate the condition of the deaf and dumb, and institutes have been established in all civilized countries to educate them in becoming useful members of society. The opportunities offered by the teaching of the oral method and lip-reading more recently introduced has greatly improved the advantages of those so affected, and while speech in these cases is rarely developed to a very high degree, still it enables them to take a more prominent part in the world in general. The training of deaf-mutes, however, is long and

tedious, not only for the teachers, but also for the pupils, and education in these cases is much more expensive than the ordinary methods. Even under the very best conditions, deaf-mutes are hampered in their relation to the world. The subject should therefore be well understood, and the tendency to increase this evil by the intermarriage of deaf-mutes and by consanguineous marriages, whether the partners are affected with deafness or otherwise, should be discouraged as much as possible, in order to minimize the propagation of this evil.

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REVIEWS.

La Suture Intestinale. Histoire des différents précedes d'enterorraphie. Par Félix Terrier, Professeur de Médecine Opératoire a la faculté de médecine, et Marcel Baudouin, Préparateur du cours de médecine opératoire a la faculté. Paris: Institut de Bibliographie Scientifique.

Suture of the Intestine. History of the Different Methods of Enterorrhaphy.

The book before us is of extreme interest to all who operate within the abdomen and to all who care for the history of surgical effort. It is intended to be a book of reference, and in it is given the history of the numerous operations for suturing the intestines, the operations being arranged according to the dates of introduction. The work contains over 400 pages, and is illustrated by 587 cuts, most of which are excellent. The indices are admirable, a merit which is not common in French books and which is extremely uncommon in the treatises of our German confrères. The authors have succeeded in producing a most valuable book, a book which is a complete study of intestinal sutures, their origins, their uses, their faults, and the details of their application.

Surely, in no department of human effort, has more energy, patience, and ingenuity been displayed than in the devising of intestinal sutures. To this subject many of the greatest masters of surgery have devoted their best talents, but they have not been alone in invention. Eccentrics with grotesque ideas; whimsical geniuses with fanciful notions; those whose only thought was to benefit man; those whose chief hope was to benefit themselves; seekers of fame; hunters of notoriety; searchers for gold; mechanicians who regarded tissues as so much wood or tin, and forgot that they were living and possessed of antipathies, weaknesses, and powers of reaction, have all had a try. From such heterogeneous influences have come scores of sutures, a few clear-cut principles, some very useful procedures, but not as yet the ideal method. Many of the methods described in this book are, of course, useless and obsolete, and to read of them is to feel like Huckleberry Finn when he read the *Pilgrim's Progress* and said the "facts" were "interesting but tough." It is curious to note how often a single method may die and be rediscovered. The use of collapsible rubber bags or cylinders to support the intestine during suturing has been discovered six times. Some methods crop up over and over again, being disinterred by some enthusiast almost as soon as the funeral obsequies are over. Treves recently commented on this curious fact. The temptation is strong to apply to some of these "busy idlers," as Michael Foster might call them, the words used by Rica in Montesquieu's *Persian Tales*: "If a man has nothing new to say why can't he be quiet. Why should we be troubled with these useless repetitions." The book of Terrier and Baudouin will render such rediscoveries less justifiable than was formerly the case.

The authors in considering the evolution of enterorrhaphy make fourteen periods, beginning with the Hindoos. The suture was suggested in the Indian Vedas. In these remarkable collections it was said that in a wound of the intestine a large beetle should be laid upon the wound in such a manner that its mandibles would fix upon the edges and close the wound. The body should then be twisted from the head. The Arabian surgeons also used "ces véritable serre-fines de nature animale." Albucasis describes the method, and, according to Terrier and Baudouin, certain beetles are still used for this purpose among the natives of Algeria. Celsus mentions suture of the large gut, but does not explain how to do it. Galen sutured the large gut. Roger, of Parma, first used artificial supports. He was professor of surgery in Salerno about 1265, and sutured the gut over a "canula" of elder wood. This plan of Roger has led to the employment of numerous other substances as artificial supports: the calf trachea of the Four Masters; dried intestine; the tallow candle of Scarpa; the gelatin tube of Watson; the varnished cord of Sabatier and Chopart; the bone plates of Senn; the bone bobbin of Mayo Robson; the potato plates of Dawbarn; the catgut rings of Abbe; the metal button of Murphy, etc.

The Four Masters lived in Paris at the end of the thirteenth century. But little is known of them. It is believed that they were four charitable men, who were drawn together by a common purpose, who lived together, and who practised only among the poor. It has usually been said that their names are unknown. Terrier and Baudouin say that their names were Archimateus, Petrosellus, Platearius, and Ferrarius. The Four Masters thought that the effort should be to bring the cut surfaces into direct contact, and in order to do this they sutured the gut over the trachea of an animal placed within. We find that the method of the Four Masters was revived and successfully applied by Duverger, of Maubeuge, in 1745. In the eighteenth century William of Salicet advised the use of the glover's suture for oblique and longitudinal wounds. The picture given of the glover's suture (Fig. 5) is the one usually given. As a matter of fact, two stitches are frequently confounded. The cut shows the ordinary continuous or seamstress stitch, which will invert the edges. The glover's or herring-bone suture will not invert the edges, and it is not probable that William of Salicet inverted the edges. Palfyn introduced a method which was long very popular. He was born in Ghent, and was a teacher of surgery in Flanders early in the eighteenth century. He believed that it was useless to sew up the bowel, as it would not unite, and suggested that the proper plan was to try to obtain adhesion to adjacent parts. Poland says he advised that a single thread be passed through each edge of the wound in the bowel, that the ends be gathered together and brought out of the abdomen, and after the bowel had been drawn close to the abdominal wall the threads be fastened to the skin by plaster.

Mr. Poland has insisted that Palfyn did not stitch the bowel to the belly wall (see Ashhurst's *International Encyclopædia of Surgery*). Terrier and Baudouin disagree with Poland, and claim that he stitched the cut bowel to the belly wall. La Peyronie modified Palfyn's method so as to apply it to complete transverse divisions. He passed the thread through the mesentery and pulled the bowel against the parietal peritoneum. John Bell advocated Palfyn's method and opposed sutures. In his discourse on wounds he claimed that suturing as advocated by

Benjamin Bell must cause gangrene. Ledran (1768) advocated treating a wound of the intestine by the passage of a number of interrupted sutures, gathering the ends together, twisting them into a cord, and bringing the cord out of the wound. The suture of Ledran applies the same principle as the suture of Palfyn. Sir Astley Cooper claimed that a small wound should be treated by pinching up the opening and fastening a thread around it. Travers used this method, but advocated suturing for large wounds, and thought that the ends of the ligature should be cut off. These old methods were occasionally, though rarely, successful. In 1822, Jobert suggested a new method for treating complete division. He dissected the mesentery from each end for a short distance, inverted the edges of the larger portion, inserted the smaller portion into it, and fastened it with sutures which entered into the lumen of the bowel. He first brought out the ends as did Ledran, but gave this up in favor of interrupted sutures. He laid down the principle that peritoneum should be brought into contact with peritoneum. Lembert, in 1826, devised the famous stitch which goes by his name, and which effects invagination of the serous surfaces, but does not enter into the lumen of the bowel, a stitch which is constantly used to-day, but in applying which we remember the advice of Halsted, and catch up the tough submucous coat. In spite of centuries of study and experience, or possibly because of unfortunate experience, at the time of our Civil War most surgeons treated intestinal wounds simply by the " do-nothing " system of giving opium. They stood by with folded hands and let the patient die. Guthrie opposed inaction, Gross advocated interference; but Gross and Guthrie were in a small minority. The great discovery of Lord Lister altered all our views and revolutionized all our methods. Surgeons awoke to the real facts and to the great possibilities of the future. Inaction has given way to radical interference and many cases are saved. America has had her full part in this advance, and the authors of this book do ample justice to Abbe, Brokaw, Ashton, Bodine, Downes, Laplace, J. Shelton Horsley, Briggs, McGraw, Dawbarn, Cushing, Matas, Mudd, and Weir, the magnificent achievements of Nicholas Senn and the noteworthy and valuable studies of Halsted and of Murphy. We do not think that the authors have fully appreciated the mine of information contained in *The Medical and Surgical History of the War of the Rebellion*. They have not mentioned the essay of T. Smith, of St. Croix, an essay which did much to discredit the suture of Palfyn, so strongly advocated by John Bell. Smith experimented on dogs, and found that operations performed as Bell advised were invariably followed by fecal extravasation and death. It is very difficult to see how the authors of this otherwise complete treatise have overlooked the work of the elder Gross. He studied this subject all his life. He made many experiments. He wrote several papers upon it. His first contribution to surgical literature was on enterorrhaphy. In this he reported fourteen operations on dogs, only one of which was fatal. His last paper, written over fifty years later, was on the same subject. For years he was one of the few who insisted that a wound of the intestine should in every case be sutured by an inversion stitch. He was a pioneer, and his great work should be set forth at length.

In closing this interesting and valuable book, we can say that Eng-

lish and American surgeons may well be proud of the part played by their countrymen in this attractive and important department of surgery. J. C. Da C.

THE RISE AND DEVELOPMENT OF THE LIQUEFACTION OF GASES. By WILLETT L. HARDIN, Ph.D., Harrison Senior Fellow in Chemistry in the University of Pennsylvania. New York: Macmillan Company, 1899.

A GREAT deal of popular interest has been excited by the recent scientific studies regarding the liquefaction of gases, and the subject has become one of immense promise in practical directions, since means have been devised for producing in liquid form gases of various sorts, and particularly for making liquid air upon a commercial scale. The advances is this branch of practical physics have followed each other with almost startling rapidity, so that it is scarcely possible as yet to form an opinion as to the ultimate uses to which liquefied gases may be devoted. The latter matter is one of intense interest to the medical profession, on account of the possibilities in various medical directions as well as from the fact that prominent characters in the history of medicine have also been associated with the history of this branch of physics. The well-known name of van Helmont is met with as one of the first to suggest the possibility of gaseous substances becoming liquefied, and it was he who first discovered the proper distinctions between gases and vapors. The more recent history of the subject, of course, embraces the names of physicists only.

Among the uses that have been suggested for liquefied air are certain adaptations to ventilation, and condensed air has been used sometimes to great advantage in various building operations, notably in caissons and tunnels. The possibility of very largely increasing this advantage by the use of liquefied air naturally suggested itself when this substance was found to be producible on a large scale. Thus far, however, this use of the liquid has not been actually carried out, and the suggestion remains as merely one of probable usefulness. Another possibility connected with ventilation is that of using the liquefied air for the purpose of cooling the atmosphere of sick-rooms or dwelling-rooms. There is, of course, the absorption of a very large quantity of heat in the expansion of a comparatively small amount of liquefied air; and if some means can be devised by which the substance can be properly conveyed, and can be exposed for evaporation, there is little doubt that an appreciable cooling influence will be exerted at the same time that a supply of pure air is furnished to the room in which the liquid is exposed. Unfortunately, up to the present time no useful method of practically carrying out this possible application of liquefied air has been devised, but there can be little doubt that the means will be found when the handling and transportation of the substance are somewhat more thoroughly understood.

A possible use that is of particular interest to physicians is that connected with disinfection, and the author refers to the experiments of Cohn, Melsens, Pictet and Yung, Coleman and McKendrick, and Pictet, all of whom have studied the effect of extreme cold or of liquefied gas-

eous substances upon various forms of animal life. The results of these investigations, however, do not give ground for much hope that liquefied air will serve a definite purpose as a disinfectant or germicide. Curiously enough, the author, though connected with the University of Pennsylvania, does not refer to the experiments conducted in the same university by Dr. Ravenel.[1] The latter investigator found that the spores of anthrax bacilli and other organisms, either in spore form or in the mature condition, resisted the action of the extreme cold of liquefied air beyond expectation. These experiments, however, consisted merely in the exposure of organisms in bulk to the direct action of the liquefied air in its liquid form. It is not impossible that the liquefied air may be indirectly useful by furnishing any places in which rapid oxidation is desirable with a large quantity of oxygen in a condensed form—in other words, it is probable that thorough "airing" may be secured for packages or for solid substances as well as infected liquid masses, such as cannot be fully exposed over a large surface. Investigations in this direction have not as yet been made.

The little book under review is presented in an interesting and popular form, and will be useful as a reference book for readers who have not a large knowledge of physics. A. S.

MATERIA MEDICA, THERAPEUTICS, MEDICAL PHARMACY, PRESCRIPTION WRITING, AND MEDICAL LATIN. BY WILLIAM SCHLEIF, Ph.G., M.D. Philadelphia and New York: Lea Brothers & Co., 1899.

SMALL books on therapeutics and materia medica are exceedingly important for the student and for the general practitioner. The rapid increase in the number of medicinal preparations, most of them of synthetic nature, requires a constant repetition of new editions, and small works have, therefore, some advantage over the larger and perhaps more scientific ones. The book under review is written by one who has had experience in the teaching of pharmacy as well as therapeutics, and his presentation of the subject is correspondingly satisfactory. The book does not pretend to enter largely into the scientific aspect of therapeutics, but in a practical way offers the information usually sought for by students and physicians in books of this sort. The chapters on Prescription Writing, Antidotes, Incompatibilities, etc., are very useful for the student, and the chapter on Dietetics is useful, though it is difficult to treat such a subject adequately in the limited space here assigned. The author classifies drugs in various groups somewhat after the manner of H. C. Wood. While this method has not been generally followed in similar books in recent years, and though there are some quite proper objections to such a classification, it has advantages in the way of bringing under the student's notice drugs having a similar action in a way that could not be accomplished were the alphabetical arrangement of remedies followed. We should have been pleased to find some mention at least of some of the newer preparations which have not as yet received the official sanction of the profession, but which are used very largely by physicians. A. S.

[1] Medical News, June 10, 1899.

TRANSACTIONS OF THE AMERICAN MICROSCOPICAL SOCIETY.
May, 1899, vol. xx.

MUCH of the advance in science, especially in its details, has undoubtedly been due to the formation of particular societies for the propagation of its categorical parts. Meetings with discussions of questions demonstrate how little even the oldest and wisest know, and encourage original work and further researches in the literature. Moreover, nothing raises the standard of such societies so much as the publication of their proceedings. Many things men utter as facts which they would hesitate to put over their names in print, very probably on the principle of the old tent-maker:

> The Moving Finger writes; and having writ
> Moves on: nor all your Piety nor Wit
> Shall lure it back to cancel half a Line
> Nor all your Tears wash out one Word of it.

We are, consequently, always glad to notice the publication of such volumes as the *Transactions of the American Microscopical Society.* In this the twentieth volume there are several subjects distinctly medical in character, and, though not startling in their originality, we wish to mention some of them. The article by Archibald Ward, on "The Persistence of Bacteria in the Milk-ducts of the Cow's Udder," is of much interest to the bacteriologist. His conclusions affirm that bacteria invade not only the teats, but ascend to the ramifications of the ducts in the udders, and remain there in an active state. Dr. Frank Parker, in his "Micrometry of the Red Blood-corpuscle," seems to draw an unwarranted, hasty conclusion. He informs us that Gram states the red corpuscles of the Northern races to be larger than those of the Southern, from measurements made on Norwegians, Germans, and Italians, which he (Parker) denies, from measurements on five persons —two from the United States, one from Italy, one from Finland, and an Esquimaux, though the diameter of the Esquimaux's was the largest. It is difficult to understand the drift of Dr. Young's article on "Medical Microscopy." It contains nothing new, and its suggestions are unintelligible or false. Some of the articles on other subjects are of a very high standard, among which may be mentioned particularly Frederic Clements' "Contributions to the Histogenesis of the Caryophyllales" and Wolcott's article "On the North American Species of the Genus Atax." J. W.

THE INTERNATIONAL MEDICAL ANNUAL AND PRACTITIONERS' INDEX. A Work of Reference for Medical Practitioners. Seventeenth year. New York: E. B. Treat & Co., 1899.

CERTAINLY the medical profession should be widely if not well read. The facilities that are offered by various ingenuous and enterprising publishers for acquiring a maximum knowledge of medical literature with a minimum of effort ought to enable every man to know all that is going on in his profession. The present book is put together according to a definite and a not illy conceived plan. It contains a number of

good special articles, particularly the one on practical X-ray work by Morris Wolfenden. The medical articles are arranged alphabetically according to the disease. Some of them are based upon a single abstract; others upon a number of papers that have appeared in different journals; the latter acquiring by their collective and comparative character an element of authority and independence that is usually lacking in such publications. Some very fair plates of pathogenic bacteria are inserted in the back of the book, and a series of notes on American "Legal Decisions," by W. A. Purrington, is, in our opinion, one of the most valuable features of the book. Altogether, for the purpose of reference to the literature of the past two years, the book is exceedingly handy and valuable. As this is an annual, it seems to us that it would be more desirable to limit the range of time during which articles that are used for abstracts may appear rather more narrowly than has been done. References to literature as far back as 1896 are by no means uncommon, and might as well have been included in an earlier edition of the book. J. S.

A TEXT-BOOK OF MENTAL DISEASES. By BEVAN LEWIS, L.R.C.P. (Lond.), M.R.C.S. (Eng.). Second edition. Philadelphia: P. Blakiston's Son & Co.

OF late years we have come to expect of a text-book of any pretensions an exposition of the anatomy and physiology of the subject under consideration. In but few text-books of nervous diseases is this necessary portion of the work neglected. The text-book of insanity that takes cognizance of the existence of a nerve-cell, its arrangement in the cortex, its comparative anatomy, or its pathological states is, however, the rare exception. This work is the exception, and such a beginning augurs well for the future in this field.

It has not been so long since we were accustomed to hear it taught dogmatically that intellectual operations were confined exclusively to the frontal lobes. The experiments of Ferrier in removing these areas in the monkey with a loss of the power of attention and interest has not been confirmed in the German laboratories. Flechsig has shown us, in a broader spirit, that the association areas in the parietal lobe are much concerned in these functions. The tendency at present is not to restrict the intellectual processes to any cortical tissue, either cerebral or cerebellar. These lessons, if they teach us anything, teach us that we cannot lay our finger with certainty upon any portion of the brain and locate the reasoning or intellectual faculties. They teach us that we must start anew in our researches with the active cellular elements of the encephalon as a basis to establish the function of each area upon some logical plan. It is, therefore, with much satisfaction that we note in this latest contribution from the pen of that sterling neuropathologist and psychiatrist, Dr. Bevan Lewis, fully one-fourth of the work devoted to the finer anatomy of the brain and one hundred additional pages to the pathology of insanity.

The discussion of the differentiation of the motor from the sensory cortex is treated in the light of comparative anatomy. The results are not positive. Experimental work has taught us that physiological laws

applicable to the lower vertebrates do not correspond in man. This differentiation of the cortex noted in the lower animals cannot be clearly defined in the human brain. It is not even definitely settled that the Betz giant-cells of the paracentral lobe are motor. The difference in lamination of the motor and the non-motor cortex is the only positive result obtained from these painstaking investigations.

We find throughout the book the neuron theory accepted and used as a working basis for the anatomical and physiological researches. That the neuron theory, as we formerly understood it, and as it is here presented to us, cannot exist in its entirety is only too evident from the newer facts brought to light by Apáthy, Baker, and Leuhossek, etc. Nor are we to understand that the neuron theory is to be thrown aside in its entirety and forgotten. The anatomical individuality of the nerve element, the unity of the cell, its processes, and the nerve fibre as a nutritional entity will remain as a vital necessity in our discussions of the nervous system and its intimate anatomical relations. There is, therefore, but little objection to the use of the neuron terminology in a work like this, but the student should not be misled, as he is here very apt to be, into believing the neuron theory as accepted fact. That the newer investigations into the cytology of the nerve cell should find no mention in a work otherwise so advanced in its teaching is indeed surprising.

As to the existence of the "scavenger cell," on which the author lays so much stress, and to which he devotes considerable space, there can be no doubt. His theory as to its development and significance will not find so ready an acceptance. The common belief is that it is a reaction of the glia cells to irritative processes, usually inflammatory in type. The author believes it to be a lymph-connective element, different in nature from the glia cell and intimately associated with metabolic changes in the ganglia cell. Its presence in the brain of epileptics and senile dements has long been recognized.

The clinical portion of the work comprises statistics based upon an analysis of 4000 cases of insanity in both sexes treated at the West Riding Asylum. The commonly accepted clinical classification is used, and a thorough psychical analysis carried out in each class of cases. The chapter on general paralysis of the insane is especially noteworthy.

The book is well written, profusely illustrated, and thoroughly indexed. The plates illustrating the cortex in health and disease we have never seen equalled. The neurologist and psychiatrist will find food for thought in every page of this most excellent work. D. J. McC.

LABORATORY WORK IN BACTERIOLOGY. By F. G. NOVY, SC.D., M.D. Second edition. Ann Arbor: George Wahr, 1899.

ON being asked a few years ago by a young man what he considered the most generally useful discovery to make in medicine, a celebrated French clinician replied: "A method of absolutely diagnosing typhoid fever in its early stage." True, this is a rather rash, spontaneous statement, but it illustrates the importance of diagnosis. When this discovery *was* made it fell in with tuberculosis, influenza, diphtheria, and gonorrhœa under the head of bacteriology.

From the limited aspect of diagnosis, considering only the diseases mentioned, what important proportions bacteriology has assumed! More important than the physical diagnosis of the lungs, which we spend months in studying, and all the bacteriologist asked was six weeks. But his turn is coming at last, as is evident from the appearance of such books as Dr. Novy's. So far we have dealt almost entirely with text-books or manuals, more or less voluminous, arranged according to theoretic divisions; here we have a departure, the arrangement following the lines on which the author has found by actual practice instruction to be the most simple. It does not pretend to be a bacteriological text-book, but a guide to a complete course of laboratory instruction in the best methods and those which the test of time has made the standard. It is compiled for the author's own course of twelve weeks, but is as well adapted for shorter courses. Designed for practical work by a practical teacher, the descriptions are clear and readily intelligible, and experiments to be done with complicated apparatus have been eliminated by illustrations that illustrate. That the work is up to its time is indicated by the fact that it describes in detail the collodium sac method for increasing the virulence of an organism, which we believe has not yet been done by any other American text-book. With such a book on the market, for teachers to make students take down dictation is a direct snub to our much-abused but revengeful old friend—Time. J. W.

CLINICAL LECTURES ON MENTAL DISEASES. By T. S. CLOUSTON, M.D. (Edin.), F.R.C.P.E. Fifth edition. Philadelphia and New York: Lea Brothers & Co.

IF, as the author tells us in his preface, the fifth edition of a work on insanity should need no further explanation of its existence, an extended review and criticism of the same would likewise seem superfluous and unnecessary. If, however, with each new edition the advancement made in pathology and treatment are recorded and discussed, the fifth edition of the work must necessarily be a very different book from the first.

In this much-quoted work on psychiatry we have presented to us in twenty lectures an experience of forty years among the insane. A subject like psychiatry in the absence of a psychology based on anatomical principles must necessarily resolve itself into a science of classification. Whether this classification be on a purely clinical or a psychological basis is of but little importance. What is of much more importance is that a nomenclature be employed which the student in general will understand. The system now in vogue by every author of a text-book on insanity of using terms which his students alone will understand and use is responsible for the wide-spread lack of interest among physicians and students for this branch of medicine.

The classification which we meet here, and which plays a very small part in the make-up of the book, has as many strong and weak points as we would expect from a mixed classification. The terminology of the various diseased mental states, psychalgia, psycalampsia, psychoparesis, etc., is based on a false psychology, or at least purely theoretical psycho-pathology, and could hardly be expected to receive general

recognition. A psychology based on facts and not pure theory is a *sine qua non* for a classification and nomenclature to which the term scientific can be applied. Until such a rational psychology, shorn of its metaphysics, be established, it would seem to us that a purely clinical classification and nomenclature could do less harm and be of more real value to the student than any other.

The value of a series of clinical lectures in printed form, like the clinical lectures themselves, depends not so much on the classification or terminology as on the character, selection, and arrangement of the cases presented, the manner of presentation, and the personality of the clinician. The lectures before us are eminently practical, the clinician never losing sight of the principle that it is his first duty to cure his patient. He has drawn freely on his long experience in giving us a work which, while up to date in all respects, yet in its principle of treatment has few equals in any language. The book is written in a very readable style, and nineteen plates in color and a complete vocabulary enhance the value of the work. D. J. McC.

PROGRESSIVE MEDICINE. A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES, AND IMPROVEMENTS IN THE MEDICAL AND SURGICAL SCIENCES. Edited by HOBART AMORY HARE, M.D. Vol. III. September, 1899. Philadelphia and New York: Lea Brothers & Co.

THE third volume of this most serviceable quarterly is devoted to a review of the contributions made to diseases of the thorax and its viscera, skin, nervous system, and to obstetrics. Dr. William Ewart, of London, has undertaken the section devoted to diseases of the heart, lungs, and bloodvessels. This review of the recent literature of these subjects is one that might properly be expected from his pen—clear, comprehensive, and complete. The pages calling especially for favorable comment are those devoted to pulmonary phthisis and tuberculosis, and to the therapeutics of diseases of the heart.

Diseases of the Skin, divided into disorders of secretions, inflammations, hemorrhages, hypertrophies, atrophies, new growths, parasitic diseases, and neuroses are reviewed by Dr. H. W. Stelwagon. This section is appropriately illustrated by a number of drawings excellently reproduced.

Dr. W. G. Spiller summarizes and presents recent neurological literature in a section of seventy pages. This contribution is particularly valuable, because of the sane comments and critical estimation of many of the articles reviewed.

A very considerable part of Dr. Richard C. Norris' review of the literature of obstetrics is devoted to the surgery of obstetrics and to the puerperium and its complications. *Progressive Medicine* seems to the reviewer to be a trustworthy guide to the medical literature of the immediate time and an adequate presentation of the really important contributions, briefly and understandingly presented. J. C.

PROGRESS

OF

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

WILLIAM OSLER, M.D.,

PROFESSOR OF MEDICINE IN THE JOHNS HOPKINS UNIVERSITY, BALTIMORE, MARYLAND,

AND

GEORGE DOCK, M.D.,

PROFESSOR OF MEDICINE IN THE UNIVERSITY OF MICHIGAN.

Chronic Stiffness of the Vertebral Column.—DANA (*Medical News*, November 25, 1899, p. 673) discusses the subject of chronic spondylitis, and reports three personal observations. Ankylosis of the spine, with or without involvement of other points, or with involvement of only the hip and shoulder, is comparatively rare, except as a result of trauma or Pott's disease. It is observed, however, in association with chronic or gonorrhœal rheumatism, in arthritis deformans, spondylitis deformans, or as an occupation kyphosis of certain laboring classes.

Chronic spondylitis has generally been classed with arthritis deformans. In recent years two types of cases of chronic stiffness of the vertebral column have been reported which were believed to possess characteristics differing essentially from those of arthritis deformans with spinal involvement.

Instances of the first type were first published by von Bechterew in 1892, when he reported five cases of "stiffness of the vertebral column with kyphosis as a special disease type." He himself and others have since recorded similar cases. Here the trouble begins in the spine primarily, and is accompanied with a progressive stiffness and arching of the back which may become very marked. The patient suffers a great deal from intercostal pains, and the hip-joints and shoulder-joints are not very much, if at all, involved. According to Marie, there is an hereditary history and frequently a history of trauma, and he calls it the "hereditary traumatic type."

Dana reports two cases which belong to this type. The first case was a man, aged forty-four years, whose present trouble began about three years before he was first seen, which was in June, 1896. He first noticed a gradual stiffness developing in the upper part of his spine, and at the same time the

shoulders became stooping and the back more and more arched. This was associated with some pain and a sense of discomfort in the back, and a feeling at times of constriction around the chest. There was never sufficient pain nor any acute illness to cause him to go to bed. The process gradually advanced until the whole vertebral column was perfectly rigid and very much arched, so that he walked with his body inclined at a marked angle. The head also became somewhat immobile, so that he could not move it upward or forward to any great extent, and the lateral movements also became lessened. There was but very little trouble with the hip-joints, and he could walk fairly well. The arms were strong, but the movements of the shoulders became rather limited.

The second case was a man, aged fifty-two years. He gave no history of injury nor of any hereditary taint. His present trouble began about one year before he was first seen, when he began to complain of pain and stiffness in the back. These pains were continuous and squeezing in character, and they ran sometimes down into the arms, especially into the left, but never involved the legs nor the viscera. These pains and the stiffness in the back continued gradually without much intermission. The patient consulted specialists in Europe, where locomotor ataxia was diagnosed. He was treated at Nauheim without relief. He returned to the United States, and was seen by Dana in 1891. At that time the spine was rigid in the cervical and dorsal regions, there being some movement in the lumbar region. The shoulder-joints were somewhat stiff. The spine was very slightly arched forward. There was no stiffness or ankylosis of the joints of the lower extremities, and no rheumatic deformities of any of the joints. The patient complained of an almost continuous feeling of constriction, sometimes amounting to pain, in the region of the fourth and fifth dorsal vertebræ, where there was little tenderness on percussion, but absolutely no kyphosis.

These two cases are believed by Dana to belong to the type of cases described by von Bechterew.

The second type of cases was first referred to by Strümpell, and later described in detail by Marie, who designated the affection by the name of "spondylitis rhizomelia," the term indicating an involvement of the spine-joints and root-joints. The condition as described by Marie is one characterized by a progressive ankylosis involving usually first the hip-joints, then the vertebral column, and the shoulder-joints. Sometimes both of the knees are affected, but never any of the smaller joints. There is no association with rheumatism or gout. The process is a chronic one, and accompanied with a little pain. Some exostoses are observable upon the sacral bones and the bodies of the central vertebræ, and also a flattening of the thorax and pelvis, with loss of thoracic respiration and muscular atrophy in the dorsal and gluteal regions. The smaller joints are unaffected. The disease attacks men only, and occurs at middle life and somewhat later.

Dana gives the notes of an interesting case which he believes belongs to this class.

In the matter of diagnosis one has to differentiate between spondylitis rhizomelia and arthritis deformans involving the vertebral column. According to Dana, the essential points which are claimed to differentiate

spondylitis are: 1. The fact that it produces directly an ankylosis, without any previous inflammatory swelling, with exudation and proliferation; also, that it produces this ankylosis directly, and not as a result of a deformity with secondary ankylosis, as in the case of arthritis deformans. 2. That it begins in the vertebral joints and extends thence to the hips and other large joints. 3. That the smaller joints are never or only rarely affected. 4. The internal organs and nervous system remain normal. 5. The clinical picture is one of great uniformity. 6. There is no previous history of rheumatism or gout, and no evidence of arthritis deformans in other parts of the body. 7. The disease occurs usually in men in about middle life.

Dana states that so far as personal observations go it does not appear to him that a special new malady has been made out. He is inclined to believe that, after all, spondylitis rhizomelia is a form of arthritis deformans.

Acute Diabetes Mellitus Supervening in a Case of Diabetes Insipidus; Coma; Death.—BLACKETT observed an interesting case in which diabetes insipidus was followed by diabetes mellitus, the patient dying eventually of diabetic coma. The etiology of the disease was attributed to mental shock and worry.

The patient was a man, aged fifty-four years. There was no family history of diabetes. In 1897 he was overworked in arranging a bazaar. He received a severe shock in May, 1898, a friend with whom he was in conversation suddenly dropping dead at his feet. In September, 1898, he was present at a fire between 2 A.M. and 5 A.M., and worked hard in an endeavor to save life and property. Almost immediately afterward he began to suffer from great thirst, dryness of the mouth, debility, and polyuria. The thirst persisted until February, 1899. The amount of urine varied between seven and eight pints to over ten pints. The specific gravity was always low, ranging between 1006 and 1010 at this time. The urine was repeatedly examined for sugar and albumin and always found negative. During January, 1899, the specific gravity of the urine ranged as low as 1002. Early in February the thirst and dryness of the mouth diminished, and the amount of urine was much less. Throughout March his general health was much improved. On April 22d he had several attacks of vomiting. The following day his general condition was much worse. The intense dryness of the mouth returned. The pulse was 120 per minute and very weak; the temperature was subnormal. During the night of April 23d he became partially comatose. On the 24th he remained quite drowsy, and marked changes in the urine were first noted. Instead of having a low specific gravity, as heretofore, it was found to have a specific gravity of 1026, and contained an abundance of sugar, but no albumin. The comatose condition deepened during April 25th, and the patient died at 10.45 P.M., the coma having lasted for about thirty-six hours.

Various lines of treatment were tried throughout the course of the disease without avail. Blackett thought that the repeated shocks to the nervous system played an important part in the etiology of the diabetes in this case. —*Lancet*, November 25, 1899, p. 1434.

Malignant Endocarditis.—As the result of the study of ten cases, EBSTEIN (*Deutsches Archiv für klin. Med.*, Band lxiii., p. 217) draws the following conclusions: Malignant endocarditis may follow either an acute, subacute or chronic course. There is no certain and constant symptomatological picture in the various cases. Other things being equal, the earlier the cerebral symptoms appear the more rapidly fatal is the disease. Not the cardiac symptoms, but the general symptoms indicate the malignancy of the process. Among the important symptoms fever stands first, characterized not only by abnormally high temperature, but also by great variations, including sometimes typhus inversus. If endocardial changes cannot be demonstrated, and if there are no discoverable local alterations to explain the fever, it is necessary to be satisfied with the diagnosis of cryptogenetic septicopyæmia. If there are, however, foci to which the fever may be attributed the difficulty of making a proper diagnosis is sometimes insuperable. Chills, even if repeated daily and regularly, do not warrant the diagnosis of metastatic abscess in malignant endocarditis. There are, therefore, no positive signs of the pyæmic form of the disease, and the latter can be recognized only when metastatic suppuration can be demonstrated in other ways. The diagnosis of the typhoid form of malignant endocarditis is only proper when other possible causes of a typhoid state are not present.

Internal Secretions and the Regulation of the Circulation.—KAHANE (*Centralblatt für allg. Path. u. path. Anatomie*, Band x., No. 23) has an interesting article on this subject. He begins with a number of axioms, such as: All glands which are independent organs have an internal secretion; the principal function of this secretion is the regulation of the distribution of blood; there are relationships between the various blood-glandular organs and between the latter and certain vascular areas; growth and development, nutrition, and metabolism depend on a proper distribution of blood; diseases of the blood-glandular organs lead to disturbances of growth, development, metabolism and nutrition, varying according to the stage of development of the different organs. The discussion of the probable internal secretions of various glands does not bring out anything especially new. The author insists that the functional affections of the internal secretions are more important to bear in mind than anatomical diseases of the various organs. So, for example, tuberculosis of the adrenals is important in the pathogenesis of Addison's disease only in so far as it affects the internal secretion of the glands. It is only according to this view that we can understand how in one case, notwithstanding anatomical disease, there is no Addison's disease; in another case, although there is Addison's disease, there is still no anatomical change in the adrenals. Similar statements could be made of the hypophysis and acromegaly. The well-known pathological relation between the parotid glands and the testes the author claims to indicate a relation in internal secretions. He also thinks that similar relations exist between the liver and the kidneys and the kidneys and the heart. In regard to the regulation of the circulation, Kahane points out that a number of glandular extracts exert an intense effect on the blood-pressure and the contraction of the bloodvessels. This is most obvious of the adrenal extract, which, when applied subcutaneously or in intravenous

injections, causes a temporary but enormous increase of the blood-pressure, or applied on mucous membranes causes an almost complete local anæmia. Thyroid extract, on the other hand, causes a fall of blood-pressure without change of the heart's action, so that one must suppose that a dilatation of the arteries occurs. Hypophysis extract increases the blood-pressure with simultaneous increase of the heart's action, but without change in the frequency of the pulse, so that a contraction of the arterioles is probable. Regarding the other extracts, there are statements going to show that they all cause alterations of the blood-pressure. Studies of the diseases of the ductless glands point to the same fact. According to the author's theory, all the vascular alterations commonly attributed to the influence of vasomotor nerves are due to the internal secretions of the various glands. He admits that the fibres of the sympathetic and vagus are in fact concerned in the distribution of the blood, but insists that the irritation for these nerves is furnished by the internal secretions. This makes it clear to him why the blood-vascular organs are so richly innervated. The regulation of the blood-supply to the different parts of the body, according to him, is due to the interaction of the blood-vascular organs, and he makes an attempt at a scheme showing the relation of the various internal secretions to certain circulatory areas, thus the thyroid and the brain, skin and bones, the adrenals and the muscles, the pancreas and the portal circulation, the thymus and the aorta, the kidneys and the aorta, etc. The terms "hæmotrophy" and "dyshæmotrophy" are introduced in order to indicate whether the distribution of blood corresponds to the needs of the single organs and the whole organism, or otherwise, and, as the author says, when the principle of hæmotrophy is understood such crude ideas as the antithesis between anæmia and hyperæmia must be abandoned. The further details of the author's sketch are not necessary to reproduce here. The extracts given should suffice to call attention to the article and show its interest in the study of many problems in pathology.

Latent Fever in Chronic Tuberculosis.—MIRCOLI (*Deutsches Archiv für klinische Medecin*, Band lxiii., p. 162) gives a thoughtful and suggestive article on this subject. Formerly fever was considered an essential symptom in tuberculosis, notwithstanding the fact that a tuberculous infection might be seen to exist in organs such as the liver, joints, or peritoneum for years without rise of temperature. Maragliano emphasized the importance of fever in the late stage of tuberculosis and its relation to secondary infections by the common pyogenic bacteria, and Mircoli, in 1896, observed cases of undoubted pulmonary tuberculosis without fever. He noticed that, especially in many cases of so-called predisposition, tuberculosis was actually present without fever. He, therefore, studied the question experimentally. He early found, as Babes had previously done, that the injection of dead tubercle bacilli was more likely to produce a rise of temperature than the injection of living bacilli. This could be explained by the fact that the dead bacilli are more easily penetrated by the fluids of the body and their proteins absorbed. The pyogenic properties of tubercle bacilli are also exhibited by the old and new tuberculins of Koch, as well as other preparations of the specific organism. On the other hand, Maragliano discovered a

group of substances which have an opposite effect on the temperature, and these observations were confirmed by de Schweinitz and Dorset. These substances, which are toxins, are continually formed anew, and enter the circulation, and therefore affect the organism in a uniform manner. On the other hand, for the activity of the proteins it is necessary that the bacilli be dead and the organism dissolve them. Their biological action is, therefore, limited, and depends on accidents. The fact that lower temperatures may occur in infectious diseases has been overlooked on account of the conventional belief that the single characteristic of fever is an elevation of temperature, although it has long been known that certain infectious diseases, such as typhoid, recurrent fever, staphylococcus and streptococcus septicæmia, etc., sometimes have no elevation of temperature, either at times or during their whole course, or may even have an abnormally low temperature. Moreover, while we know that certain other organic substances, such as milk, peptone, etc., cause an elevation of temperature, others, like urine, bile, and snake-poison, reduce the temperature. Mircoli studied the temperature of tuberculosis in animals. In one hundred and twenty guinea-pigs inoculated with various quantities of bacilli the more important results were as follows: When the infection is intense, as by two and one-half milligrammes, the elevation of temperature begins in the second week. It sometimes increases, sometimes decreases, but persists almost constantly until death between the twentieth and thirtieth day. With a smaller quantity, say one milligramme, there is at first an elevation of temperature, but the course soon becomes apyretic and then just before death, between the second and third months, rises again. With a still lighter infection, as by one-half milligramme, the course is typically apyretic, with very rare elevations of temperature during the whole disease, which may last from four to six months. Regarding the relation between the temperature curve and the anatomical changes in guinea-pigs, there are many striking contradictions, although an extensive and sudden infection is likely to produce high temperature. In other words, the range of temperature is not so dependent on the extent of the anatomical process as on the mode of action of the tuberculous poison which produces it. The study of the temperature in human pulmonary tuberculosis is surrounded with difficulties on account of the impossibility of knowing the exact condition of the alterations. Mircoli is undoubtedly right in raising the question whether what we call evident pulmonary tuberculosis is not really the later stage, the so-called predisposition, actually the stage of maturity, of the disease. In studying the temperature-curve of out-patients he found that elevation due to tuberculosis was extremely rare. In many cases with extensive anatomical lesions of the lung and many bacilli in the sputum, normal and subnormal temperatures (axillary) were found. He therefore studied the heat-regulating functions in these cases. Other writers had previously assumed that the temperature in tuberculosis follows a lower plane than in most other febrile diseases. So Volland held that fever in tuberculosis begins at 37° or, at the extreme, 37.2° C. Spengler assumed the presence of fever if the temperature was above 37.5° in the rectum or above 37° C. in the axilla. This peculiarity cannot be explained by such things as anæmia, because the author found low temperature in patients with an actual increase of the red globules.

That the low temperature is actually due to a hypothermogenic substance was demonstrated by injecting serum of a febrile tuberculous patient into other afebrile tuberculous persons. The result was that the temperature sank lower in these patients than the author had ever observed before. Mircoli studied the temperatures in the rectum and axilla, and found a greater difference than the half degree Centigrade usually considered normal. It often amounted to 1° and sometimes as much as 2° C. This difference is not constant at different times of the day in the same patient, but is usually less in the morning and greater in the afternoon. Mircoli found an inverted type of temperature very rarely in tuberculosis, and does not think there is any particular type for the latent fever. The sweating of tuberculosis has sometimes been considered a consequence of rise of temperature. Careful observation, however, proves that this is not so, and Maragliano was able to find an ethereal extract of tuberculous toxin which produced sweating without affecting the temperature. Chetrien, who studied the subjective fever of tuberculous patients, found that in some of them there was a subjective feeling of fever, although the temperature in the axilla was not elevated. To sum up, the author holds that the thermal level in tuberculosis is somewhat lower than in health—*i. e.*, from 2° to 5° C.; that the difference between the internal and external temperatures is greater, on the average 1° C.; that the sensibility to internal and external thermogenic factors is increased; that there are thermopsychic phenomena which indicate the transition from the latent to the manifest form of tuberculosis. Studies in metabolism parallel to the preceding observations are promised.

SURGERY.

UNDER THE CHARGE OF

J. WILLIAM WHITE, M.D.,

PROFESSOR OF CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA; SURGEON TO THE UNIVERSITY HOSPITAL;

ASSISTED BY

ALFRED C. WOOD, M.D., INSTRUCTOR IN CLINICAL SURGERY, UNIVERSITY OF PENNSYLVANIA; ASSISTANT SURGEON, UNIVERSITY HOSPITAL.

AND

C. L. LEONARD, M.D., ASSISTANT INSTRUCTOR IN CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA.

Partial Retention of Urine, Its Consequences and Treatment.—WARDEN (*Edinburgh Medical Journal*, July, 1899) points out the fact that an incompletely emptied bladder is a difficult condition to diagnose, and yet it is all important that early treatment should be instituted, which will prevent the complications which follow this condition if it remains undetected and untreated. The ensemble of symptoms is, however, so complete in these cases that when once found the diagnosis is absolute. Prostatic enlargement is the disease which produces most of the cases of partial retention, and yet it is often not until there is complete retention that the patient complains of

any symptoms referable to the bladder. The recognition of the early symptoms is, therefore, very essential. They are nocturnal polyuria and persistent digestive troubles. Bimanual rectal examination will clear the diagnosis, while the catheter will prove it beyond a doubt. Care should be taken not to empty the bladder too rapidly. This may be done very gradually, and yet completely, by stopping before it is empty, injecting warm boric-acid solution, and again partially emptying, repeating the process until the urine comes away clear. The golden rule is to empty the bladder often, for long and aseptically. If the early period of prostatic enlargement be tided over successfully one may hope to be spared the greater anxiety of later complications.

When the stagnation of urine becomes so prolonged and extreme as to be accompanied by positive distention of the bladder it forms the most serious and most intractable, and yet the most overlooked, of all forms of partial retention of the urine. The central fact of the condition is the distended state of the bladder, which makes itself felt throughout the whole of the urinary tract, from the ureters to the parenchyma of the kidneys themselves; the disorders thus set up, at first functional, soon become organic, and as there is yet no infection, and, therefore, no cystitis, there is nothing beyond some frequency of micturition to direct attention to the urinary apparatus. The patient's tongue is red and dry, and coated to such a degree that swallowing and even mastication become intolerably distasteful. Vomiting and diarrhœa may set in, or the dyspepsia may express itself simply in loss of appetite and headache and a sense of gastric weight. On the other hand, constipation of most obstinate form may be the predominant feature of the digestive disturbances. The whole system may present an appearance that would make a diagnosis of cancer of the stomach possible. The patient will be found to be passing large quantities of urine, and the author says "it cannot be too dogmatically stated that when the three symptoms—polyuria, frequency of micturition, and grave digestive troubles—are present the *fons et origo mali* is almost certain to be the bladder that the patient cannot empty." The greatest care should be taken in these cases to keep the bladder empty and not to infect it with the catheter.

Wounds of the Heart and Pericardium.—LOISON (*Rev. de Chir.*, 1899, Nos. 1, 2, 6, and 7) reaches the following conclusions, after an exhaustive study of this subject, in which he reviews all the literature and tabulates all the reported cases.

1. The symptom-complex of wounds of the heart and pericardium is no less certain than that of the peritoneum or of certain abdominal viscera.

2. The diagnosis is as difficult and as delicate in the one case as in the other, and requires all the surgeon's vigilance.

3. The prognosis is not always grave, as the statistics which the author has collected and Fischer's show.

4. Therapeutics are not unavailing, as has been proved by numerous successful interventions which have lately been carried through by various surgeons.

The author has tried to show that there is a greater field for active intervention, and that such intervention has a chance of success.

Shock in Modern Surgery.—SHRADY (*Medical Record*, July 22, 1899) points out very clearly the great danger that threatens modern surgery. The perfection to which aseptic technique has been developed makes it possible for almost any practitioner to perform major operation. The patient is under the anæsthetic and feels nothing; asepsis secures primary reunion, so that the operator can take all the time he desires, and if the patient dies it is attributed to shock, for the wound is aseptic and there has been no great loss of blood.

This author points to the difference between modern and the former age of surgery, where brilliant operators, with perfect technique and lightning rapidity, operated without anæsthesia or antiseptics, and secured wonderful results. They could not depend upon anæsthesia and asepsis to cover the defects of technique, but by the rapidity of their operations saved so much of the shock to the patient that his vitality could do more for him.

Shrady says: "We must not forget that prolonged administration of anæsthetics is, independently of the operation, a means of shock in itself. While ether may tend at first to modify shock, its prolonged use adds to the depression of the patient. The same may be said for chloroform. The bodily temperature is lowered if the administration of ether continues longer than an hour or an hour and a half. Often, especially in chloroform cases, the normal temperature is not restored until the lapse of twenty-four hours. This delayed reaction is itself an evidence of serious mischief done to the nervous centres. These changes are often sudden and correspondingly dangerous. Although more frequently seen with chloroform, they occur often enough with the safer anæsthetic—ether—to place us on our guard.

"It is not inconsistent with carefulness that we should do our work more quickly. We should shorten not only the period of anæsthesia, but that of the operation itself. To do whatever is absolutely necessary, and do that as quickly as possible, is the primary consideration. Of the two methods of procedure the one that takes the shortest time should always be preferred. In grave and prolonged operation, it is much safer to divide the work into two periods, if possible, rather than strain a point to finish it in one."

There is a certain larger amount of shock in all operations in highly nervous areas, as is evidenced by the extra amount of anæsthetic required. In the preanæsthetic days the effect of the division of a nerve or bone was seen immediately in the pulse. There can be no doubt but that there is still much of this shock felt by the system despite the anæsthesia. "Quick reaction follows quick operation. The two hold a proper relation to each other for good. On the contrary, the longer the operation the longer is the reaction delayed. How often do we hear that the patient failed to rally after hours of fruitless stimulation?"

A New Invagination Method of Intestinal Anastomosis.—MORISANI (*Centralblatt f. Chirurgie*, 1899, No. 32) describes a new method of anastomosis which he has employed with success in a number of cases, and has proved by experiments on animals to be technically efficient in all cases.

A strip of mucous lining is removed from the inner surface of the distal end of the intestine, so that it permits the proximal to be invaginated into it. When this has been accomplished it is held in place by fixation sutures,

while a continuous suture unites the cut end of the distal portion of the gut, with its raw muscular layer, to the serous surface of the proximal or invaginated portion. The process of invagination protects the stitches and the line of union in a degree from contamination by the intestinal contents, while strengthening it against pressure from within. The denuding of the muscular coat where it is brought in contact with the serous surface of the proximal portion in the line of union hastens the reparative process and frees the wound from the contamination of the intestinal contents. The histological examinations made on the experimental cases showed that firm adhesion is present in twenty-four hours, and that there is no contraction of the lumen of the gut. The method is free from the objections made where foreign bodies are employed, while the suture line is protected from infection from within the bowel.

Remarks on a Case of Total Extirpation of the Stomach and the Treatment of Gastric Cancer—RICHARDSON (*Boston Medical and Surgical Journal*, September 28, 1899) reports the findings at an autopsy in a case in which he removed the entire stomach. There was a recurrent mass at the left of the epigastrium, which had infiltrated the peritoneum under the rectus and had spread about the walls of the small intestines. There were nodular masses in the mesentery of both large and small intestines. Minute nodules were scattered everywhere. Near the splenic flexure the lumen of the colon was totally obstructed. Beyond this point the bowel was collapsed; above it was enormously distended. The orifice at the point of anastomosis was large enough for the passage of food, and the parts were firmly bound together. There was no sign of recurrence at the line of junction.

The author concludes from the case, first, that the patient's health would have been fully re-established had there been no recurrence of the original disease; second, that the suffering was due to the mechanical effects of a chronic obstruction rather than to cancer itself: finally, that œsophagoduodenostomy is technically possible in a certain percentage of cases.

As regards operation in cases of cancer of the stomach this author says: The first indication for operation is a strong suspicion that malignant disease is present. Even then operation is inadvisable in marked cachexia (other than hemorrhagic), and in such diseases of other organs as will compromise success—diseases of the heart, lungs, kidneys. The local lesion may be out of proportion to signs, or *vice versa*. Local signs that justify resections are circumscribed tumors without contiguous or remote implications. Infiltrating masses not sharply defined which approach contiguous viscera so that they must be closely shaved do not justify radical measures. When complete removal of the diseased tissue requires complete extirpation of the stomach there is no local contraindication if the operation is technically possible.

It seems clear that radical operations upon the stomach must necessarily be infrequent. A case favorable enough to justify so serious a measure as partial resection cannot often present features that are favorable as to time, extent, complications, and general constitutional excellence. If partial excisions are thus limited complete extirpations must be still more infrequently justifiable. The only method of discovering favorable cases for operation is earlier exploratory laparotomy.

The Wisdom of Surgical Interference in Hæmatemesis and Melæna from Gastric and Duodenal Ulcer.—ARMSTRONG (*British Medical Journal*, October 21, 1899) reports two cases which have called his attention to the result of delay in operating, which is in a great measure dependent upon the two conservative tendency reflected in the medical literature of to-day.

When aneurism and leukæmia have been excluded, which should be readily possible in the latter case by the aid of the microscope, he holds that it is the surgeon's duty to interfere in suitable cases, which he defines, first, as those of frequently repeated small hemorrhages which persist in spite of medical and dietetic treatment, and threaten to destroy the life of the patient; and, secondly, in all cases of large hemorrhage which, in spite of medical and dietetic treatment, recur. In these cases he advocates operation after the second hemorrhage. With hemorrhage occurring in cirrhosis and portal obstruction, he does not think that the surgeon can accomplish any good. In these cases the hemorrhage is from a varicose œsophageal vein, a part difficult of access, and is secondary to a pathological lesion but little amenable to any form of treatment.

In cases of gastric and duodenal ulcer, however, the conditions are totally different. The lesion is primary and local, and in addition to the securing of the bleeding point a more smooth and rapid convalescence is obtained, the likelihood of perforation removed, and if found advisable the performance of a gastro-enterostomy or pyloroplasty secures to the stomach that rest which so favors the healing of the ulcer and ensures against the subsequent occurrence of narrowing and obstruction to the pylorus.

The Technique of Gastro-enterostomy.—RUTKOWSKI (*Centralblatt für Chirurgie*, 1899, No. 39) has had very satisfactory results from combining with Wölfler's gastro-enterostomy a temporary gastrostomy by either Witzel's or Kader's method. After performing the gastro-enterostomy he makes a small incision above it and passes in through this a drainage-tube which is brought out of the abdominal wound after one of the above-mentioned methods of gastrostomy. The tube passes into the stomach, through the opening of the gastro-entero-anastomosis, down into the afferent portion of the jejunum.

The combination of these two operations in one affords an opportunity for the immediate nourishment of the patient without the danger consequent upon feeding by the mouth, while the gastric juices that collect in the stomach have every opportunity to pass along beside the tube into the bowel. After a lapse of ten days, when the patient has recovered from the operation and the union is complete, the drainage-tube is removed and the gastric fistula closes spontaneously.

The author briefly reports three cases in which this method of operating led to very satisfactory results.

Two Cases of Primary Sarcoma of the Tongue; one Pedunculated, the Other Interstitial.—DOWNIE (*British Medical Journal*, October 21, 1899) reports two cases of this rare form of sarcoma—*i. e.*, lingual. One was pedunculated and the other interstitial, with a marked involvement of surrounding structures.

He compares these two cases with the following results:

1. In the first the early discomfort was supposed to be due to a simple catarrhal inflammation of the throat, while in the second it was considered to be the result of injury.

2. The pedunculated growth did not involve the tissue of the tongue to any depth, while the tumor in the second case was situated deep in the substance of the tongue.

3. The growth of the neoplasm was in the first case rapid, and unaccompanied by œdema, while the interstitial tumor was of comparatively slow growth, and its presence was accompanied by considerable œdema of the organ.

4. The disease in the first case was confined to the tongue, while in the second case several secondary growths appeared at an early stage.

Osteoplastic Operation on the Mastoid Process.—KÜSTER (*Centralblatt für Chirurgie*, 1899, No. 43, p. 1145) describes an osteoplastic technique which he has employed with success for the past five years in operations on the mastoid sinus. It consists in raising by means of a broad chisel a flap which is made up of skin periosteum and bone over the mastoid sinus. The ear is drawn forward and the incision made posterior to the muscle down to the bone through the periosteum. The flap has its base toward the ear. The periosteum is freed only sufficiently to allow the chisel to map out three sides of the flap, which is then cut from the surface of the bone and turned back in contact with its covering of integument. The operation is completed upon the sinus. It is packed with gauze as usual, and an end brought out through the wound. A piece is cut from the bone flap with rongeur forceps sufficient to permit the easy passage of the gauze. The flap is then sewn in place.

The value of the results attained are to have a linear scar without deformity and to preserve the form of the bone. The operation is no more difficult or dangerous than the ordinary method, and can be performed rapidly. The pressure that can be applied where the sinus has been injured is greater with a greater aseptic security. The healing is by primary union, and the result from a cosmetic stand-point all that could be desired.

Traumatic Paralysis of the Shoulder and Arm.—MALLY (*Revue de Chirurgie*, October 10, 1899) gives the following as the results of traumatism that is acute in character:

1. Complete paralysis in the terminal fibres of the nerve.

2. Loss of cutaneous sensibility in the distribution of the nerve. This varies in different individuals.

3. Rapid muscular atrophy.

4. A special reaction of degeneration in the muscles.

5. A histological degeneration of nerve and muscle.

These traumatisms produce nearly all the neuropathological conditions. The lesion may involve the nerve in all degrees, from the terminal fibres in the hand to the larger trunks in the axilla, and even to the plexuses and nerve-roots. They may even reach the fibres in their medullary course. The derangements of sensation which accompany these paralyses are very incon-

stant. They are not to be depended upon in judging of the motor involvement. The degrees of involvement are also very variable, from simple irritation to complete solution of continuity.

The histological lesions are divisible into three groups: 1. Lesions that are irritative, in which the condition of the muscles and nerves is ill defined and recalls the lesion of the atrophy of degeneration. This condition is transitory and does not tend either to increase for the worse or to rest stationary. It is the simple atrophy of paralyses by compression; it is difficult, as a consequence, to recognize it experimentally. 2. Degenerative changes which are represented by a return to embryonal conditions of the anatomical elements; it is this atrophy of degeneration that accompanies the section of nerves, their tearing or very severe compression. 3. Numerical atrophy, as described by Klippel, which consists in a diminution in the number but not in the volume of the anatomical elements—these are the grave reflex paralyses, together with certain myelopathies, traumatic or otherwise.

The electrical reaction which corresponds to each of these three pathological conditions is very distinct, and serves to differentiate between them at an early period. The simple atrophy has no relation either quantitative or qualitative to the electrical excitability, no matter what the degree of atrophy.

Degenerative atrophy is always accompanied by the reaction of degeneration. Finally, the numerical atrophy has a quantitative diminution only to the electrical excitability of two currents.

Hysterical paralyses can be readily diagnosed, especially if electrical tests are employed. The reflex paralyses are the only ones that can be readily confused.

Suture of the Fibrous Capsule in Fracture of the Patella.—Vallas (*Revue de Chirurgie*, October, 1899) discusses the value of different methods of treating fractures of the patella, and, while not advancing it as an original idea, holds that both his experience and anatomical considerations justify him in believing that the suture of the fibrous capsule is as essential in those cases where surgical intervention is demanded as is the suture of the bone, and that it will, in the majority of instances, produce a better fibrous union if not bony union. It is better to employ it alone than suture of the bone alone.

He describes his method of treatment as follows: The fractures in which bone alone is involved are to be treated by compression, massage, and early movements, as in hæmarthrosis of the knee.

Those fractures of the patella that are accompanied by a rupture of the fibrous sheaths surrounding the bone require radical treatment. The operation of choice is an arthrotomy with a toilet of the articulation and suture of the lateral tears of the capsule. The suture of the bone is unnecessary.

It is often difficult to decide the particular case at hand. As a rule, a separation of three-quarters of an inch or more requires operation. All surgeons agree thus far. When the limb is extended such separation is impossible without a rupture of the lateral portion of the capsule. But it frequently happens that these portions of the capsule are ruptured without

so much displacement. These are the cases that give trouble later. The author has made it his practice to wait three or four days, treating these cases for the hæmarthrosis. At the end of this time the swelling and pain have decreased and more definite knowledge can be obtained. It is sometimes possible to recognize by palpation a lateral tear. At the end of the fourth day, if it is a simple fracture, the patient can lift the limb from the bed. If he can do so, operation is not necessary. If he cannot, operation should be undertaken at once.

PEDIATRICS.

UNDER THE CHARGE OF

LOUIS STARR, M.D.,
OF PHILADELPHIA,

AND

THOMPSON S. WESTCOTT, M.D.,
OF PHILADELPHIA.

Cerebro-spinal Meningitis Complicating Measles.—FRANK W. ENGLAND (*Montreal Medical Journal*, November, 1899, p. 850) reports the case of a healthy boy, aged six years, who had a mild attack of measles. On the third day the eruption was beginning to fade, and the temperature and pulse had fallen to normal. On the following day he appeared somewhat dull and inclined to doze. There was some obstruction to breathing through the left nostril, which was blocked with a membranous exudation. The cervical glands, however, were not enlarged, the throat was clean, and the pulse and temperature remained normal. A few hours later, without the slightest warning, the child was seized with a severe general convulsion. This was followed by continued moaning and restlessness, with deepening stupor. A second convulsion occurred about ten hours after the first, slight in character, chiefly affecting the tongue, which was protruded in a jerky manner, with much frothing at the mouth. The temperature had risen to 103° F., and the pulse had become rapid.

After the convulsion restlessness was very marked. Two hours later the temperature reached 105° F., the stupor had increased, but the pupils still reacted to light and remained equally contracted. There was some rigidity of the muscles, but the head was not drawn back to any extent; there was neither squint nor any other sign of paralysis. No urine had been passed for twenty-four hours, and then only two and a half ounces were withdrawn by the catheter. The specimen was high colored, slightly acid, of specific gravity 1028, no albumin, no sugar, no casts. Convulsions recurred twenty-four hours after the second one, and from this time the child passed from one into another until death occurred, two hours thereafter and thirty-eight hours after the first convulsion. The temperature reached 109° F. before death. There was no vomiting throughout, and no cutaneous eruption. Two

hours before death a culture was taken from the nose, and this showed the presence of the diplococcus intracellularis. Cultures from the noses of two other children of the family showed the same organism. From this and other confirmatory negative evidence the author considers the case one of epidemic cerebro-spinal meningitis, the port of entry of which infection was doubtless the nose. The author refers to the view of Dr. Adami, who has reported the finding of meningococci in the nose as well as the meninges in a case of cerebro-spinal meningitis, that the nose was, in his opinion, a common avenue of infection in such cases.

It is interesting to note that two of the other children who were ill of measles at the same time also developed a similar condition of the nares—namely, a membranous rhinitis—which, in spite of treatment, lasted three weeks. The membrane was abundant, thick and firm, completely plugging the nose for days, and when detached left a bleeding surface. In addition to the membrane there was a copious muco-purulent secretion. Cultures taken ten days after the onset showed the meningococcus and the staphylococcus. The author has been unable to learn of any other reported case of cerebro-spinal meningitis complicating either measles or scarlatina.

Concerning the Infectious Character of and the Relation Between Acute Articular Rheumatism and Chorea.—WESTPHAL and WASSERMANN (*Berliner klinische Wochenschrift*, 1899, No. 29) describe, among other cases more briefly mentioned, a case of acute articular rheumatism in a patient aged nineteen years. During the second month after the onset of the arthritis choreiform movements began in the left arm, and in a few days involved the whole of the voluntary muscles of the body. The mental functions were distinctly disturbed. The pulse was very rapid, 96 to 140, but no valvular abnormality was detected. Labial herpes appeared, and the patient shortly after died in severe delirium.

At autopsy an early endocarditis of the mitral valve and parenchymatous nephritis were found. There was no suppuration. From the blood, the brain, and the mitral valve was obtained a micro-organism which, when introduced into the blood of animals, produced high fever and arthritis of grave type. The joints thus involved were found inflamed in all their structures, and in the exudate, which was either clear or turbid, the same micro-organisms were found. They possessed the property of inducing similar changes in the joints of other animals into whose blood they were in turn injected. In some of the experimental cases swelling would subside in one joint to begin actively in another far removed from it. This organism was a streptococcus belonging to the class supposed for some time to have a causal relation to acute articular rheumatism.

Tetany Simulating Tetanus.—GUINON (*Société de Pédiatrie*, October 20, 1899; *Revue Mensuelle des Maladies de l'Enfance*, November, 1899, p. 524) reports the case of a boy, aged four and one-half years, who, after complaining for three days of paroxysmal pain in the knees, was brought to the hospital with all the signs of tetanus. There was marked trismus, stiffness of the neck, and paroxysms of opisthotonos upon the slightest touch. There was, however, no fever, but Roux, who saw the case in consultation, inclined

to the diagnosis of epidemic cerebro-spinal meningitis. This, however, was not confirmed by the subsequent course of the case, which resolved itself into a tetany, as shown by the fact that opisthotonos was produced only under certain definite conditions, and by the fact that after a few days appeared two symptoms absolutely characteristic of tetany: a contracture of the eyelids and a contracture of the lips with the carp's snout appearance of the mouth.

All these symptoms disappeared suddenly on the tenth day, upon the appearance of an otorrhœa, following a median otitis, which had escaped observation. During convalescence the child had incontinence of urine and feces.

This is the second instance in which the author has observed a tetany with symptoms of tetanus, and he thinks the condition deserves to be classified as tetany of the pseudotetanus form.

Treatment of Rhachitis by Suprarenal Extract.—STOELTZNER (*Berliner klinische Wochenschrift*, September 11, 1899) has treated seventy-six cases of rhachitis with suprarenal extract, and under its use he has observed rapid alteration in the general condition, diminution of the sweating, of the vasomotor irritability, and of cranio-tabes. The thorax became firmer, the teeth appeared, and the power of locomotion was gained about the normal time. Laryngospasm was the only symptom that seemed to resist the treatment. The post-mortem of an infant that had died of bronchitis during the treatment showed normal calcification of the bony substance and almost complete disappearance of the osteoid tissue.

Formaldehyde as a Milk Preservative.—A. G. YOUNG (*Proceedings of American Health Association*, November, 1899; *Medical Record*, November 11, 1899) makes the following conclusions in regard to the action of formaldehyde as a preservative of milk: 1. That used as a preservative it tends at least to impair the nutritive value of milk. 2. Its tendency is to interfere with the digestive processes. In either case it is only a question of dosage, and the limit of safety is difficult to determine. 3. That though the inhalation of formaldehyde gas is much less dangerous than the breathing of the other gaseous agents much used as disinfectants, the results of tests upon animals, and of one case of accidental poisoning of a human being, indicate that formaldehyde taken into the digestive system may produce dangerous and even fatal results. 4. It would be unwise and unsafe to encourage or to suffer the use of formaldehyde in the public milk-supply, even under any possible restrictive regulations. 5. In every State, as is now the case in many, there should be a law prohibiting with effective penalties the use in milk of any chemical preservative whatsoever.

Treatment of Prolapsus Ani by Ice Tampons.—HAJECH (*Revue Mensuelle des Maladies de l'Enfance*, November, 1899, p. 525) recommends for the treatment of chronic prolapse a procedure which has always been successful in his hands, even in the gravest cases. It consists in the introduction of fragments of ice into the anus during the reduction of the prolapse. These suppositories should be cone-shaped, artificially frozen, measuring 7 to 8 cm. in length, and in diameter at the base 2½ to 3 cm. One of these is enveloped

in a piece of iodoform gauze, which should cover it like a glove-finger, and is pushed into the centre of the prolapse, which can thus be readily reduced, the ice and gauze being carried up with the protruded bowel. Usually no painful sensation is produced and the tampon is not expelled. After each defecation a new gauze and ice tampon is introduced. The prolapse occurs more and more rarely, and soon ceases. This result is due to the relief of congestion and the increased contractility of the rectal tissues under the influence of the mechanical and thermic excitation provoked by the ice.

Erosion of the Tonsil following Scarlatina.—BERGÉ (*Société de Pédiatrie*, October 10, 1899; *Annales de Médecine et Chirurgie Infantiles*, November 1, 1899, p. 819) reports the observation of a mild and benign case of scarlatina in a girl, aged four years, which was followed after an interval of fifty-four days by a superficial ulceration upon the face of one of the tonsils, which persisted for nearly a month. At the beginning it was accompanied by fever and swelling of the glands at the angle of the jaw and in the cervical chain. Later there was acute nephritis characterized by blood and albumin in the urine, and slight puffiness of the face. The erosion slowly healed, leaving a grayish-yellow scar which was visible three months afterward.

Hæmophilia.—GEORGE W. WAGNER (*The Physician and Surgeon*, September, 1899, p. 397) reports two marked cases of this diathesis, in which he seemed to arrest hemorrhage, after other means had failed, by exposure of the wound to the air in conjunction with the application of very hot water by means of little pledgets of absorbent cotton. In one case the hemorrhage followed amputation of a portion of a finger, and in the other, a Jewish child, aged four years, it came from a small laceration of the mucous membrane of the upper lip at the frænum. In the latter case the lip was rolled upward and kept in this position by strips of adhesive plaster in the form of an inverted T, the ends of the cross-piece being fastened to the cheeks and the perpendicular to the forehead. From a study of the literature he concludes:

1. That hæmophilics make blood rapidly, the cause of which is undetermined.

2. That there is a tendency to plethora of the smaller vessels, especially of the capillaries.

3. That the deficiency of oxygen in the blood is one of the main reasons for its slow coagulation.

4. That the narrow lung space, at least in some cases, is a factor in the deficient oxygenation of the blood, and would suggest that in future the capacity of the lung space should be carefully noted.

5. That apparently the best remedy to control hemorrhage is oxygen, either by inhalation or contact. It acts in two ways, causing greater rapidity in the coagulation of the blood, and causing the nuclei of the endothelial cells of the capillary wall to swell and to narrow the lumen of the vessel.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,

PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

The Treatment of Pulmonary Tuberculosis.—DR. HOMER M. THOMAS presents his results from the use of inhalations of antiseptic nebulæ. He believes that he has obtained microscopical proof of the penetrability of vaporized medicaments into the pulmonary alveoli. The value of nebulization is stated to be (1) control of cough; (2) relief of dyspnœa; (3) intimate contact of antiseptic nebulæ upon fourteen hundred square feet of respiratory capacity; (4) inhibition to the extension of tuberculous foci. The advantage of controlling cough by inhalation rather than by internal medication is self-evident. By bringing to the inflammatory areas, through direct contact, especially adapted expectorant or anodyne combinations, many or all of the distressing symptoms from cough may be allayed. The relief of dyspnœa incident to the blocking of the larger or smaller tubes by catarrhal products is often marked. An abundance of air compressed to from fifteen to thirty pounds to the square inch is necessary. This should pass through a series of antiseptic chambers to rid it of all impurities, and after purification and compression it should be passed through oil of cloves. In cold weather the air should be warmed to 60° or 70° F. before using. To relieve cough a mixture of tincture of stillingia and beechwood creosote, with lanolin as a base, is often quite sufficient. For dyspnœa, ammonium carbonate, syrup of squill, and syrup of wild cherry, with lanolin as a base, often give marked improvement by removal of catarrhal blocking of bronchial tubes. For antiseptics, eucalyptus, oil of cloves, beechwood creosote, 10 per cent. solution of iodoform in ether, and lanolin are serviceable. A 10 per cent. solution of pure Ceylon cinnamon oil in lanolin is an excellent stimulant to the bronchial mucous membrane. Formalin, however, appears to be the most valuable antiseptic when used as a 4 per cent. solution of the 40 per cent. aqueous commercial solution in water. This is placed in the nebulizer and violently agitated by means of compressed air. This solution is not nebulized, but evolution of this gas, through a mechanical mixture and agitation due to the pressure of compressed air, is preferred. Patients acquire an increasing tolerance of the formalin mixture, and by degrees its strength can be increased to 20 per cent. Its administration, however, must be immediately stopped so soon as cough ensues. Fifty patients, all in the second or third stage of this disease, were under observation during five months. Fifteen gained in weight from two to twelve pounds; thirty-four lost weight, and five remained stationary. Various forms of apparatus may be employed to compress the air. A double glass tube so constructed as to occlude the anterior nares will enable the patient to inspire freely through the nasal passages. The nebulæ can be admitted through a single glass tube held between the

lips, slightly compressed, and inhalation will take place through the mouth as well as an admixture of atmospheric air through the nares. The preferable method is the use of a pure rubber funnel top, such as is used for gastric lavage. This is readily adjusted to all the irregularities of the facial contours, and very little of the nebulæ escapes, while deep inspiratory efforts can be made simultaneously through the nares as well as the oral opening. — *Western Medical Review*, 1899, No. 10, p. 330.

Phthisis Treated by Epidermic Application of Guaiacol.—Dr. A. F. Shoyer, from a study of the literature, concludes: 1. Many encouraging results are reported. 2. The drug is absorbed by the skin. 3. Antipyresis is undoubted. 4. There may be profuse night-sweats, exhaustion, and collapse. 5. The temperature tends subsequently to rise to a higher level. In his own experience a rapid fall of temperature follows application of the drug. To avoid the sudden decrease in temperature and accompanying prostration, guaiacol was applied when the temperature was at its minimum. The drug may be painted on the skin, or applied on wool beneath a watch-glass, or as a compress. Six minims of guaiacol thrice daily, increased to thirty minims, was the usual amount prescribed. Absence of effect resulted in many instances. It is suggested that ether previously applied might aid absorption. Of fourteen patients thus treated the average gain in weight was 2.32 pounds. Of twelve unselected patients, the average weekly gain was 1.25 pounds. Of twenty-five patients ten improved, twelve were unaffected, three grew worse. Five of the ten who improved were febrile and more or less free from secondary infection; three were subfebrile and probably infected by germs of suppuration, and two were indefinite. The conclusion reached is that the patients most favorable for treatment are those with pyrexia and free from secondary infection. Patients with subfebrile temperature do fairly well. If there is apyrexia, no effect follows treatment, while if both pyrexia and marked secondary infection are present bad results follow. Most of the patients discharged improved subsequently returned worse, so that no permanent effect was obtained.—*The Scottish Medical and Surgical Journal*, 1899, vol. v. p. 204.

Physiological Action and Therapeutics of Guiamar.—Dr. George F. Butler speaks very highly of this drug. It is the most recent of the derivatives of the phenol group. Commencing with crude creosote, steady advancement has been made. Benzosol (guaiacol benzoate) and guaiacol carbonate are limited in usefulness, owing to their irritating action. Both drugs are insoluble in water; the glycerol ethers are soluble in water; the acidity of phenol is replaced by a pure bitter taste. Guiamar is the glycerol ether of guaiacol, and is formed by the action of anhydrous glycerin or pure guaiacol. It is a dry, white, crystalline powder, soluble in alcohol, chloroform, etc., and in about twenty parts of water at ordinary temperature; it is neutral, non-hygroscopic, with a bitter, aromatic taste. Guiamar is compatible with quinine, cod liver-oil, malt, hypophosphites, and pepsin. It is antiseptic chiefly through the liberation of nascent guaiacol, partly in the stomach, but chiefly in the intestinal canal. Glycerin also is set free. This decomposition occurs only at the site of diseased tissues; in a healthy

normal stomach it is doubtful if guiamar undergoes any change. It does not interfere with normal digestion, but has a tonic effect; thus, in impaired nutrition, marked improvement actually occurs. Like other members of the group, guiamar is also antipyretic, diuretic, and diaphoretic. It is readily absorbed through the unbroken skin. Its antiseptic properties are fully equal to other drugs of the same class; the chief advantage in guiamar is that through its stomachic properties it stimulates appetite and digestion. If there be gastric fermentation or putrefaction (dilatation) guaiacol is liberated and bacterial development is checked. Peristalsis is also stimulated.

The dose is from three to fifteen grains thrice daily, if no irritation of the genito-urinary tract occurs. Patients having typhoid fever to whom guiamar was given had less fever, and the general symptoms (?) were less severe. In twenty thus treated (cold baths also being used) there was no marked tympanites and no intestinal hemorrhage. The digestive system remained in excellent condition. When the drug had been exhibited for several days, in most cases the stools became inodorous. An ointment of guiamar and lanolin, two drachms to the ounce, applied to painful joints in acute rheumatism greatly lessens the pain. In several instances gonorrhœal arthritis treated locally with guiamar, drachms two; belladonna and mercury ointments, of each drachms four, met with marked success. Guiamar is a valuable expectorant in chronic bronchitis and bronchopneumonia. Fetid expectoration is much benefited (antiseptic effect). In initial pulmonary tuberculosis, and to a less extent in later stages, night-sweats, cough, and expectoration are much improved. Bed-sores treated with guiamar and balsam of Peru, of each one drachm, benzoinated zinc oxide ointment to one ounce, improve rapidly. Guiamar can be used for a variety of conditions requiring local antisepsis; it is unirritating in aqueous solutions, and can be applied to open wounds. The drug is a powerful genito-urinary antiseptic (chronic cystitis), but does not counteract excessive alkalinity as rapidly as benzosol. An idiosyncrasy is sometimes formed, guiamar causing considerable dysuria. In blennorrhœa and gleet guiamar is superior to benzosol as an internal remedy. In the intestinal tract it is invaluable as an antiseptic, acting locally. The summer diarrhœas of children (especially those due to bacteria) are immediately benefited, intestinal decomposition ceasing.—*New York Medical Journal*, 1899, vol. lxx. p. 438.

Iodine in the Treatment of Scorbutus.—Dr. Martinord reports that four or five drops of the tincture of iodine in a small glass of brandy, thrice daily, relieved in a few days, and soon cured, a patient under his care. A second instance, even more remarkable, was one showing much subcutaneous hemorrhage, gangrenous wounds, and diarrhœa.—*Klinisch-therapeutische Wochenschrift*, 1899, No. 29, S. 950.

Suprarenal Extract in Surgery.—Dr. A. G. Aldrich has made use of this vasoconstrictor in the surgery of the eye, ear, nose and throat. It also contracts erectile tissue, and for these reasons is of great value in operations upon mucous membranes. The solution is: Suprarenal extract, 1; boric acid, 1; sterilized water, 48; filtered and made up at the time of its use. The local action endures from twenty minutes to one hour. It allows a

deeper and more perfect anæsthetic action when used in conjunction with cocaine; hæmostasis is more prolonged, and secondary hemorrhage is prevented. It is reliable in action, does not injure the tissues operated upon, nor does it interfere with aseptic healing.—*The Medical Dial*, 1899, vol. i. p. 280.

[The reports have been so generally favorable that it can safely be said that this remedy has obtained a secure position among the valuable resources of the ophthalmologist and laryngologist.—R. W. W.]

The Treatment of Aneurism with Gelatin Injection.—Dr. A. Fraenkel reports a single instance of aortic aneurism, the tumor situated beneath the sternum, at the angle of Ludwig. A 1 or 2 per cent. of sterilized gelatin solution in a 1 per cent. normal saline or soda solution was used for the purpose of increasing the coagulability of the blood. A relative cure—merely to prevent perforation—was expected. Twelve drachms of the above solution were injected under the skin of the abdomen, causing great pain. In all, ten injections were made, twice weekly, without disturbance, the pains becoming less. As results: The pulsation lessened and finally disappeared, the swelling disappeared, and the opening in the sternum grew smaller.—*Klinisch-therapeutische Wochenschrift*, 1899, No. 30, S. 978.

Treatment of Nervous Diseases.—Dr. Harry Campbell does not find it necessary to use a large number of drugs, but urges understanding thoroughly a few. First and foremost comes potassium iodide, which, if syphilis be suspected, should be given in drachm doses, three or four times daily. An instance of the efficacious dose of this drug is cited, to which thirty grains of sodium salicylate had been added upon the suspicion that the headache might be rheumatic. Quinine, in ten-grain doses at bedtime, if any periodicity is manifested, should not be forgotten. Ammonium chloride is a valuable drug in neuralgia, particularly of the fifth nerve. Here, again, large doses are necessary. As a prescription: Ammonium chloride, thirty grains; tincture of gelsemium, seven and one-half minims; tincture of aconite, one minim; fluid extract of licorice, one drachm, with water sufficient to make an ounce, should be taken at the onset of pain and repeated every hour until three doses are taken. Lastly, the bromides are recommended, the base being chosen according to the patient. Often epileptics do well on strontium bromide. If the fits occur only at night, forty to sixty grains at bedtime may do better than divided doses during the day. Seven and one-half drops of the tincture of nux vomica will counteract its depressing effects. Strychnine should not be given in the same solutions with the bromide. All vicious habits should be carefully inquired into and corrected—tobacco, alcohol, tea. Peripheral irritations from the scalp, eyes, nasopharyngeal space, teeth, ears, digestive organs, and reproductive system must be sought out and their causative influence obviated.—*Treatment*, 1899, vol. iii. p. 337.

Methylene-blue.—Dr. M. P. Michailow, from laboratory research, concludes that the changes in tissues and organs of healthy animals under the influence of medicinal doses of this substance are distinct contraindications

to its use in patients at the dose and for the time during which it is usually administered. In proof of this position he cites the vomiting, diarrhœa, and blue urine so frequently observed. The microscopical sections tend to support his contention.—*St. Petersburger medicinische Wochenschrift*, 1899, No. 23, S. 209.

Therapeutics: Past, Present and Future.—Dr. George F. Butler calls attention to the employment of inductive methods of reasoning, characterizing the present century, in physiology, pathology, and medicine. As a result, the scientific habit of thought has been developed. Mention is made of the great progress in serum-therapy. The following is the author's definition of an antitoxin: it is "not the direct result of bacterial action, but is properly described as an unknown body, resulting from the resistance of healthy organisms to the toxins of pathogenic bacteria." Antitoxins, properly prepared, should be as harmless as blood-serum administered in the same way. They are used to resist the action of the toxins, and not as germicides; good culture media can be made from antitoxin serum. A theory of their action is that they neutralize the toxin, and the natural bactericidal powers of the body do the rest. Definite knowledge of the therapy of these sera is scanty. Experiments to prove that toxins are albumoses and antitoxins globulins are not conclusive. That a stimulation of the germicidal power of the body follows the administration of antitoxin seems logical, for streptococci rapidly disappear after the exhibition of antistreptococcic serum. Diphtheria bacilli remain present, however, long after antitoxin administration. High praise is awarded diphtheria antitoxin as a specific. One thousand units are recommended as an immunizing dose, and two thousand for all suspected patients. Good results from the use of diphtheria antitoxin in asthma, acute bronchitis, etc., may be explained by the natural immunity of the horse against these diseases, the favorable action being due to the blood-serum and not to its contained diphtheria antitoxin (McClintock). Antistreptococcic serum is praised more highly than recent reports seem to warrant. Special reference is made to its usefulness in erysipelas and puerperal septicæmia. Its value in destroying the "mixed infection" of phthisis is still undetermined. Tetanus antitoxin, though the results so far are not encouraging, is recommended *early* in the attack and in large doses. Chemical combination occurs between tetanus toxin and nerve tissue, with a resulting rapid destruction of the latter. It follows that, as tetanus antitoxin has no such chemical affinity, it neutralizes only the toxin remaining in the blood-current, and does not repair destroyed nerve tissue. Early diagnosis is indispensable to successful results. As a preventive the antitoxin is wholly satisfactory. In selecting an antitoxin the necessity of obtaining it from a reliable source is very strongly urged. Only that hermetically sealed is wholly safe from contamination. Foreign sera are not as satisfactory as domestic ones. Recent advances in pharmacology are also noted. Drugs at present assayed by the physiological method are ergot, cannabis indica, digitalis, strophanthus, convallaria, elaterium, and cocaine. It is strongly advised that no preparations of these drugs be given unless derived from stock of a known physiological strength.—*Medicine*, 1899, vol. v. p. 609.

Observations on Diphtheria; Cure by Douches of Sodium Phenate without Antitoxin Injections.—Dr. Roulin reports the results obtained in a patient thus treated. A little sulphate of quinine was given as an emetic, and the throat painted with a solution of sodium phenate (strength not stated). This was repeated hourly, day and night. The temperature declined in twelve hours, and the membranes diminished in extent. The following day there was a rise in temperature without apparent cause, and nasal irrigation was added to painting of the throat. Bacteriological examination showed a mixed infection of Löffler bacilli and staphylococci. The child (seven years old) soon learned to gargle, and this was substituted for painting the throat. Enlargement of the cervical glands rapidly disappeared, and the membrane in the throat was much diminished. A potion of quinquina was substituted for the sulphate of quinine. The patient made a rapid recovery. Another patient similarly treated did equally well. The author wishes to emphasize the fact that especially in diphtheria, with mixed infection, lavage of the throat with antiseptic solutions is to be prescribed in addition to the antitoxin treatment.—*Journal de Médecine de Paris*, 1899, vol. xi., No. 20, p. 201.

Ovarian Opotherapy.—Dr. U. Arcangell has studied this subject with reference to chlorosis. He considers (1) that this method of treatment is harmful to chlorotics; (2) the results of this treatment show that the influence of the ovary upon the organism is of a chemical nature; (3) chlorosis is an ovarian intoxication caused by absent or incomplete menstrual depuration; (4) at present the only form of opotherapy which offers any prospect of success in chlorosis is the medullary; (5) organic iron preparations are always efficacious in chlorosis; (6) inorganic iron preparations are specific against ovarian intoxication; (7) at present the therapy of chlorosis consists of good feeding and Blaud's pills.—*La Riforma Medica*, 1899, No. 91, p. 185.

GYNECOLOGY.

UNDER THE CHARGE OF

HENRY C. COE, M.D.,

OF NEW YORK.

Calcium Carbide in the Treatment of Inoperable Carcinoma.—Ries (*Journal of the American Medical Association*, 1898, No. 29), referring to Etheridge's recommendation of this agent in carcinoma of the uterus, affirms that its action is identical with that of the ordinary caustic lime. He is inclined to attribute the beneficial effects rather to the preceding curettement than to the carbide of calcium, and cautions the profession against expecting any marked results from its use.

Periodical Delirium during Menstruation.—Trénel (*Annales de Gynécologie*, 1898, No. 3) describes a peculiar form of delirium which recurs at

the beginning of each menstrual period, the patient being entirely free from mental disturbance in the interval. It may assume the form of mania, melancholia, or hallucinations, usually begins suddenly and ceases as suddenly. It may appear at any age from puberty to the time of the climacteric. The prognosis is favorable (68 per cent. of the writer's patients having recovered), though it may become chronic and terminate in early dementia.

Cyst of a Supernumerary Ovary.—THUMIN (*Wiener klin. Wochenschrift*, 1898, No. 38) describes an interesting case of ovariotomy in a girl, aged twenty-two years, in whom the diagnosis of torsion of the pedicle had been made. The right tube and ovary were entirely normal, likewise the left ovary. The left tube was adherent to a simple serous cyst, the pedicle of which was twisted twice. An examination of the growth showed the presence of true ovarian tissue containing normal follicles, so that there could be no doubt that it developed from a true supernumerary ovary. Microscopically its structure indicated a transitional form between cystoma and cystoadenoma.

NEUMANN (*Archiv für Gynäkologie*, Band lviii., Heft 1) reports a case of dermoid cyst of a third ovary, with malignant degeneration of its wall. He regards the condition as perithelioma developing from the adventitia of the vessels or from the endothelial layer of the perivascular lymph-spaces. This, he believes, is allied to sarcoma rather than to carcinoma.

Transplantation of Ovaries.—MARCHESE (*Arch. Ital. di Gin.; Centralblatt für Gynäkologie*, 1899, No. 31) reports the result of a series of experiments in animals in which ovaries were removed and transplanted either to a distant site in the same animal (between the parietal peritoneum and psoas, between the fascia and rectus, or beneath the folds of the broad ligament) or to the pelvis of another animal. Rabbits survived the operation only a short time, but only one of the dogs operated upon died of peritonitis. The results varied greatly. While many of the ovaries were found to be nearly or quite normal after the lapse of several weeks (five months in one instance), in others more or less marked necrotic changes were observed, especially at the points of entrance of ligatures. In no instance was there any change in the general condition of the animals or any increase in adipose.

The writer infers that ovaries may be transplanted from one animal to another, or from their normal position to distant sites in the same animal, without impairment of their functions. In order to ensure integrity of a transplanted ovary it is important not to transfix it with sutures, but to attach it by means of a new pedicle, avoiding any possible compression from neighboring organs.

Ligation of the Uterine Arteries for Hemorrhage.—MANGIN (*Annales de Gyn. et d'Obstétrique*, 1899, No. 2) thinks that ligation of the uterine arteries is a simple operation, free from danger; it can be performed without anæsthesia. It is especially useful in cases of obstinate hemorrhage in which curettement is followed by negative results on account of the absence of disease of the endometrium. After ligation of the arteries in cases of uterine

fibroid the hemorrhages nearly always cease, and the neoplasm often undergoes atrophy, provided that it is not situated in the lower uterine segment. Disease of the adnexa is the only contraindication to the operation.

Dermoid Tumor of a Third Ovary.—FRANZ (*Monatschrift für Geb. u. Gyn.*, Band viii., Heft 1) reports the case of a primipara, aged forty years, from whom he removed a dermoid cyst of the right ovary. Attached to the pedicle was a smaller intraligamentous dermoid, which was regarded as a development from an accessory ovary.

Glandular Hypertrophy of the Cervix Simulating Carcinoma.—DE SINÈTY (*Ibid.*) describes the following condition, to which Bouilly called attention: The patient, a multipara, aged thirty-two years, complained of abdominal pain with profuse leucorrhœa, but without any disturbances of menstruation. Examination through the speculum showed an irregular tumor the size of a hazelnut, which could be lifted from the subjacent tissue. On palpation it gave the impression of being cystic, and was found to consist of a number of cysts with limpid contents. The growth was of unusual size and might easily have been mistaken for a malignant neoplasm.

Metrorrhagia of Ovarian Origin.—BOUILLY (*La Gynécologie*, April, 1899) includes under this head hemorrhages which occur in connection with cystic or cirrhotic changes in the ovaries, where the uterine mucosa is apparently normal. The ovarian lesions are divided into three classes, viz.: Simple cystomata, small papillary cysts, and general sclero-cystic degenerations. Metrorrhagia, in connection with the first two conditions, is a symptom of secondary importance as compared with others due to the presence of the neoplasm. When associated with chronic changes in the ovary, without marked enlargement, the true cause of the profuse and prolonged flow is only inferred after repeated examinations and the failure of the ordinary methods of treatment. This form of metrorrhagia is confined to young women, usually nullipara, whose sterility in the absence of any discoverable uterine disease is inferred to be of ovarian origin. Curettement often shows that the endometrium is healthy. Although the flow may sometimes persist during almost the entire month, it shows a certain regularity in its recurrence, there being a clear interval between the periods, without the persistent sanguinolent discharge which is observed in cases of intra-uterine neoplasm.

Operation for Incontinence of Urine.—GONBAREFF (*Journ. d'Obstét. et de Gynécologie*, 1898, No. 6) reports the case of a virgin, eighteen years of age, who had been troubled with incontinence for ten years, due to a fall. Urine escaped constantly during locomotion or when the patient was recumbent. No local abnormality could be determined, and the urine was normal. Medical treatment being unavailing, the writer performed two separate operations (one of them being Gursuny's torsion method), without success. Believing that the meatus was situated too low down, he attempted to restore it to its proper position by a modification of Tait's operation. A transverse incision was made at the posterior border of the vestibule, the ends of which were extended upward on the anterior vaginal wall. The flap thus marked

out was turned backward and a purse-string suture was passed through its free border and tied. The edges of the vertical wound thus formed were united, the result being to lift the opening of the urethra upward and permanently to relieve the incontinence.

Operation for Vesico-Uterine Fistula.—DRANITZINE (*Journ. russe. de Gynéc. et d'Obstétrique*, 1899, No. 9) speaks highly of an operation which consists in separating the bladder from the uterus, and closing the vesical and uterine openings separately, after which the wound in the anterior vaginal fornix is sutured. The advantages claimed for it are as follows: The entire field of operation is brought into view without the necessity of incising the cervix and everting its lips, as practised by Joubert; uretero-uterine fistulæ may be repaired in the same way, and an accompanying vesico-vaginal fistula may be closed at the same sitting; in all the reported cases the cure has been perfect and permanent, and no complications have occurred during or after operation. Two cases are reported by the writer.

Extirpation of the Uterus and Bladder.—MODLINSKY (*La Gynécologie*, April, 1899) reported at a meeting of the Moscow Surgical Society the following remarkable case: The patient, aged forty-five years, had been ill for a year and a half, having become much emaciated, with metrorrhagia, foul discharges, and vesical disturbances. The presence of carcinoma of the cervix was recognized, and an attempt was made to remove the uterus per vaginam. After the patient was anæsthetized it was found that the disease had invaded the vesico-vaginal septum, so that in irrigating the uterine cavity the bladder was opened. It was then decided to adopt the sacral route, and the uterus, adnexa and entire bladder were extirpated, the ureters being sutured to the vaginal vault. The patient made a good recovery, was entirely relieved of pain, and was free from recurrence at the time of writing. The patient was, of course, annoyed by the constant dribbling of urine, which the reporter hoped to be able to relieve by a subsequent plastic operation upon the vagina.

The Surgical Treatment of Retroflexion.—SIELSKI (*Centralblatt für Gynäkologie*, 1898, No. 33) insists that any method of correcting retroflexion which results in fixation of the uterus is based on erroneous ideas, as would be the permanent immobilization of a joint after reduction of a dislocation. The relief often experienced after the separation of adhesions, followed by ventrofixation or vagino-fixation is due to the former rather than to the latter step in the operation; the symptoms are apt to recur in time, by reason of the impaired mobility of the uterus.

The axiom may be stated that operations which secure the greatest amount of mobility of the uterus are those which are followed by the fewest unpleasant after-symptoms.

Thrombosis of the Crural Veins after Operation.—LENNANDER (*Centralblatt für Chirurgie*, 1899, No. 19) calls attention to the occurrence of this complication after abdominal operations, especially in women, citing five cases of his own following appendectomy. He believes that it is usually due

to retarding of the circulation from weak cardiac action added to prolonged rest in the recumbent posture after operation. Tympanites, which is such a common accompaniment of laparotomy, seems to increase the intra-abdominal pressure and, hence, to obstruct the circulation in the iliac veins, while the negative pressure in the thorax is diminished in consequence of the superficial inspirations. Changes in the vessel-walls, either pre-existing or of septic origin, constitute another factor.

It is remarkable that thrombosis seldom occurs after severe and complicated operations, which may be explained by the fact that drainage seems to regulate the disposition of the fluids remaining in the peritoneal cavity, while the frequent elevation of the foot of the bed favors the venous return. Hence the writer recommends the adoption of the latter practice as a prophylactic measure after every abdominal operation, and also after thrombosis has developed. In order to stimulate the heart's action and to increase the blood-pressure subcutaneous infusion of saline solution is recommended. Care should be observed not to compress the crural or saphenous veins by a tight bandage. When varices exist elastic bandages should be applied.

OBSTETRICS.

UNDER THE CHARGE OF

EDWARD P. DAVIS, A.M., M.D.,

PROFESSOR OF OBSTETRICS IN THE JEFFERSON MEDICAL COLLEGE; PROFESSOR OF OBSTETRICS AND DISEASES OF INFANCY IN THE PHILADELPHIA POLYCLINIC; CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE WOMAN'S MEDICAL COLLEGE; VISITING OBSTETRICIAN TO THE PHILADELPHIA HOSPITAL, ETC.

The Extirpation of the Septic Puerperal Uterus.—PROCHOWNICK (*Monatschrift für Geburtshülfe und Gynäkologie*, 1889, Band ix., Heft 6) contributes a very interesting paper upon this subject. He draws attention to the fact that the mortality of the puerperal state has not been lessened as greatly as was hoped when antiseptic precautions began to be taken in labor. He estimates that in Germany from three to four thousand deaths occur yearly from puerperal septic infection, and from eight to ten thousand cases in which death does not occur, but in which the patient's health is more or less damaged. He has found the treatment by serum useless, and has given attention to the problem of finding out when the septic puerperal uterus should be extirpated.

It is evident that this serious procedure is justifiable only when it is positively known that the uterus is the site of the infection, when other means have been employed without result, and when the patient is evidently growing worse. He calls especial attention to the importance of studying each case during the first two days of the puerperal period without disturbing the patient by prolonged examinations. Each puerperal patient who has fever should be kept as quiet, as clean, and as comfortable as possible. The pulse, temperature, and respiration should be carefully recorded every

four or six hours. Especial importance is attached to the condition of the pulse. The intestine should be emptied once in the most thorough manner possible. The patient should be once examined very carefully and thoroughly. If the pulse reaches 100, the heart, the lungs, and the spleen should be examined thoroughly, and the urine should be taken by catheter and subjected to examination, and the lower portion of the birth-canal should also be examined. Lacerations, either closed or without suture, and fissures in the perineum and vagina should be thoroughly examined. If no focus of infection is found, and the pulse does not exceed 100, no further examination of the birth-canal should be made.

When the patient's condition is serious and she has chills, high fever, a small and rapid pulse, the vagina should be douched with warm sterile water, and some of the lochial discharge should be taken from the cervix. A careful bimanual examination should also be made. These measures, however, can rarely be carried out satisfactorily in private practice, and it is evident that some other method giving positive information is very desirable.

For some time the writer has practised the regular examination in such cases by taking cultures of the blood. The region of the elbow and the forearm are antiseptically prepared, and with a sterile syringe 10 cm. of blood is taken from a vein, and a portion of it mixed with sterile bouillon, and the remainder placed in a sterile glass as soon as possible. Cultures are made from this blood and incubated, and in from twelve to twenty-four hours the results may be obtained. In his experience a fatal result has occurred in each case in which streptococci were evidently present in the blood. When, however, the blood was free from germs, all of the patients recovered but two, who perished from purulent peritonitis occasioned by streptococcus invasion through laceration in the vagina and cervix. When, however, it was impossible to remove suppurating decidua or pieces of placenta or moles, or when after labor myoma had become infected, and when the patient had a small and rapid pulse and distention of the uterus and abdomen, the cultures from the blood were positive and the cases demanded the removal of the uterus. Cases of incomplete abortion furnished many of these patients.

He also raises the question as to whether the removal of the uterus is not more appropriate in cases where rapid absorption of toxines is going on from the uterus rather than where virulent bacteria are found within the blood. While this query is difficult to answer, he draws attention to the fact that a negative culture from the blood in a severe case shows that typical pyæmia is not present, but does not make sure a favorable result. This method of examination is especially useful in preventing useless and harmful local interference. It especially justifies the absolute rest treatment employed in the first days of a septic case. When the cultures of the blood remain negative the uterus should be cleansed and douched with 50 per cent. alcohol, and should improvement not follow, its extirpation must then be seriously considered.

The writer sums up his experience by stating that he cannot decide upon extirpation of the uterus from the results of examination of matter taken from the vagina or uterus, but that he considers the examination of the

blood of far more importance. If pyæmia is present, complicated with tumors in the pelvis, suppurating portions of the ovum or septic criminal abortion, extirpation of the uterus is not indicated, because it can rarely save the patient. If, however, it is evident that the uterus alone is pyæmic, and that these complications are not present, then the removal of the uterus may be followed by a good result.

Tubal and Abdominal Gestation.—In the *Monatschrift für Geburtshülfe und Gynäkologie*, 1899, Band ix., Heft 6, occur two papers upon this subject.

The first is by BOTH, who describes tubal pregnancy upon the right side, which ruptured in the fifth month with considerable pain and shock to the patient. She continued, however, to improve, and abdominal section was delayed until the eighth month. On opening the abdomen the child lay among the intestines without an amniotic sac. The child was living, and survived delivery twenty hours. It was impossible to make a pedicle, and thus to remove the placenta immediately. The patient made a good recovery.

KREISCH reports from Martin's private hospital in Berlin five cases of tubal pregnancy, in which the diagnosis was made and the operation performed. The paper is interesting as illustrating the advantages of operating through the vaginal wall in these cases. In two of these patients it was possible to remove the tube and contents completely through the anterior wall of the vagina. Patients operated on in this manner made a more speedy convalescence and with less disturbance than those treated by abdominal section.

Puerperal Hyperpyrexia.—In the *Edinburgh Medical Journal*, June, 1899, LACKIE describes the case of a multipara delivered with forceps after severe birth pressure, who had an excessively high temperature, reaching on several occasions 110° F. A vesical vaginal fistula formed, with extensive sloughing. The patient was treated by free application of ice and by free stimulation. She finally made a complete recovery.

The case was thought to be one of supræmia, as evidences of septicæmia and pyæmia were not present.

Accidental Hemorrhage.—JARDINE, in the *Scottish Medical and Surgical Journal*, June, 1899, describes the case of a multipara, seven months pregnant, who had profuse hemorrhage, following straining in emptying the bowel. As the os was fully dilated, the membranes were ruptured and the child delivered by forceps. Firm pressure over the uterus expelled several large black clots and the placenta, which had been completely separated. Post-partum bleeding was checked by a hot douche, and, under ergotine and ether, with the injection of saline fluid, the patient recovered.

He also reports the case of a woman having a contracted pelvis, in whom labor was induced. During the course of the labor a de Ribe's bag was introduced to dilate the os, and was filled with carbolic solution pumped in through a compression syringe.

The patient suddenly became white and the pulse grew very weak. Blood-stained fluid was at once discharged. When the bag was withdrawn it was found to have a rent nearly an inch long in its side. The patient

was at once delivered by version of a living child. Secondary hemorrhage from a torn cervix caused her death. The bursting of the bag had caused separation of the placenta, which was fatty, followed by fatal hemorrhage.

On examination, the bag was found to have been made of some preparation of rubber. Some of these bags are made of silk, and might possibly be stronger. The case illustrates one of the dangers of induced labor.

In general, in premature separation of the placenta, Jardine advises delivery as soon as possible. He calls attention to severe pain in the womb, which is often present, and also to the fact that at times the womb in these cases is soft and relaxed, and at other times firm and tense.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

J. SOLIS-COHEN, M.D.,

OF PHILADELPHIA.

Stenosis of the Œsophagus.—I. *Diverticulum of the œsophagus due to an intrathoracic colloid struma.* This case is reported by H. STARCK (*Berlin. klin. Wochenschrift*, 36 Jahrg., No. 25; *Philadelphia Medical Journal*, October 21, 1899), who utilized the gastrodiaphane and the Röntgen ray in making the diagnosis. The patient died of voluntary starvation, and a huge tumor the size of two fists was found covered by the upper and middle lobes of the right lung. The diverticulum, as big as a fist, projected from the posterior wall of the pharynx, and the œsophagus was reduced to a tube scarcely the thickness of a lead-pencil.

II. *Spindle-form enlargement of the œsophagus.* This case is reported by DR. SCHWÖRER (*Münch. med. Wochenschrift*, 46 Jahrg., No. 25; *Philadelphia Medical Journal*, October 21, 1899), and occurred in a railroad conductor, aged fifty years, who for thirteen years had at times difficulty in swallowing, more marked after excitement, showing the stenosis to be in part spasmodic. The spindle-form of the dilatation of the œsophagus was verified by the use of a bismuth injection and the Röntgen rays.

Foreign Body in the Œsophagus.—DR. G. G. EITEL, of Minneapolis, Minn., reports (*Medical News*, September 16, 1899) an external œsophagotomy for the extraction of a tooth-plate which had been impacted in the œsophagus for six years and four months. The patient is in good health nearly six years after the operation.

Follicular Pharyngitis.—Tumefactions of the pharynx, indicating what is popularly known as follicular pharyngitis, are really due to lymphoid nodules in the mucous membrane. PROF. V. GRAZZI, of Florence (*Annales des Mal. de l' Oreille, du Larynx*, etc., October, 1899) claims to be able to secure

their absorption by compression from above downward with a metallic roller. He has found this method, during two years' practice, of special advantage in the treatment of chronic catarrhs of the middle ear.

Amygdalitis.—Treatment of follicular and suppurative amygdalitis and the angina of scarlet fever by the injection of a solution of carbolic acid, varying from 1 per cent. to 4 per cent. in strength, is strongly commended by DR. H. JUDSON LIPES (*New York Medical Journal*, October 21, 1899) as the result of treatment in nineteen cases. All but two cases were among children from eight months to fifteen years of age.

Cysts of the Tonsils.—MONNIER (*Archives Internat. de Laryng.*, May and June, 1899; *Annales des Maladies de l'Oreille, du Larynx*, etc., October, 1899) calls attention to cysts of the tonsils, with caseous contents of varying grades of protrusion, occurring without any inflammatory reaction. The contents of these cysts are aseptic. The condition is sometimes mistaken for that of malignant degeneration. Simple incisions of the pouch, its curettage, and the cauterization or removal of the cystic portion assure complete cure.

Peritonsillar Abscess Associated with Diphtheria.—DR. THOMAS HUBBARD reports (*New York Medical Journal*, October 14, 1899) two cases. Case one was a farmer, aged thirty years. On the fifth day of an acute amygdalitis his right tonsil was incised, with evacuation of some pus, and on the next day the two tonsils and the pharynx were found to be covered with false membrane. Despite 3500 units of diphtheria antitoxin in divided injections, the membrane rapidly invaded the rhinopharynx, nares, and larynx. Laryngeal stridor soon necessitated tracheotomy, which was performed after the patient was apparently lifeless; but artificial respiration for fifteen minutes, with the tracheal dilator in place, restored the action of heart and lungs. The patient died eighteen hours later, the immediate cause being, apparently, pulmonary œdema. The trachea was in the same condition as the throat, decidedly œdematous and covered with diphtheritic membrane.

The second case occurred in a family of a number of children, six of whom were sick with sore-throat, or with amygdalitis, or with undoubted diphtheria.

Pendent Growths of the Tonsil.—Two cases of polypoid hypertrophy of the tonsil are reported by DR. V. TEXIER (*Annales des Mal. de l'Oreille, du Larynx*, etc., October, 1899, illustrated), and their histological characteristics are described and illustrated. They were of the type of lympho-angiomatous rather than fibroid angiomatous growths.

An analysis in the same journal records a case of pendent tonsil reported by PAUL REINHARD (*Wien. klin. Wochenschrift*, 1899, p. 373).

Accessory Thyroid-gland Tumors in the Base of the Tongue.—Tumors in the base of the tongue, due to enlargements of accessory thyroid glands, have been recognized only in the last decade or so, probably because they were formerly classed among fibroids, owing to lack of accurate microscopical

investigation. About fifteen cases comprise the entire record, all but one having occurred in female subjects.

Dr. Arthur W. Watson, of Philadelphia, reported two cases, one of them in a colored girl, at the last meeting of the American Laryngological Association (*New York Medical Journal*, October 21, 1899, illustrated), and Dr. J. E. Schadle, of St. Paul, Minn., reported two cases to the Section of Laryngology and Otology at the last meeting of the American Medical Association (*Journal of the American Medical Association*, October 21, 1899, illustrated).

In Dr. Watson's cases the growths were removed with the electric incandescent snare. In Dr. Schadle's cases one growth was removed by external access through the floor of the mouth, while the second patient declined an operation.

Thyroid-gland Metastasis in the Nasal Cavity.—L. Harmer reports (*Philadelphia Medical Journal*, October 21, 1899; *Wien. klin. Wochenschrift*, Jahrg. 12, No. 23) a case of carcinoma of the cervical glands in which metastasis took place to the base of the brain, with involvement of the optic muscles and nerves, and penetration into the posterior nares. It was the tumor in this region that was first noted and which led to the investigation which resulted in the detection of the general involvement.

DERMATOLOGY.

UNDER THE CHARGE OF

LOUIS A. DUHRING, M.D.,
PROFESSOR OF DERMATOLOGY IN THE UNIVERSITY OF PENNSYLVANIA,

AND

MILTON B. HARTZELL, M.D.,
INSTRUCTOR IN DERMATOLOGY IN THE UNIVERSITY OF PENNSYLVANIA.

Finsen's Phototherapy.—Bie (*Philadelphia Medical Journal*, October 7, 1899) describes at some length the methods employed and the results obtained by Finsen in the treatment of lupus vulgaris and some other affections by means of concentrated light. About three hundred and fifty cases of lupus vulgaris have been treated with this agent. In the milder cases the light is employed alone; in the more severe ones the light-treatment is supplemented by treatment with an ointment of pyrogallic acid. The pyrogallic acid is first applied, and when the cauterization is healed this area is subjected to light. Ulcerations are freed from crusts by cataplasms of boric-acid solution. A solution of iodine and potassium iodide is applied to the lesions on the mucous membranes, or the galvano-cautery is used. Only disease of the skin, hard palate, the front part of the nasal septum, tongue, and mucous membrane of the cheek can be healed by the treatment by light. In all the 350 cases the improvement has been so certain and constant that there is reason to doubt the diagnosis when this treatment is ineffective. In many cases of lupus erythematosus, phototherapy

has produced permanent recovery; but the effect of this treatment in this malady is not nearly so certain as in lupus vulgaris. Seven cases of alopecia areata have likewise been cured by this method of treatment. Later experiments seem to demonstrate the curability of even old cases, but only after long treatment. The results of these experiments are regarded as supporting the theory of the infectious origin of alopecia areata.

The Lesion of Molluscum Contagiosum.—AUDRY (*Annales de Dermatologie et de Syphiligraphie*, 1899, No. 7) believes that molluscum contagiosum is a lesion of the epidermis. The absence of any connection with the hairs, the impossibility of finding any trace of a sebaceous process, the character of the surrounding connective tissue, are so many arguments against the adoption of the follicular or sebaceous origin of the affection. The nodule is not a neoplasm in the proper sense; it is a specific metaplasia peculiar to this affection. The author, while believing that the malady is a parasitic one, does not accept the views of Bollinger and Neisser, but thinks the parasite has not yet been discovered.

Treatment of Ungual Trichophytosis.—JOHNSTON (*Journal of Cutaneous and Genito-urinary Diseases*, September, 1899), at a meeting of the New York Dermatological Society, reported a case of trichophytosis of the nails (the diagnosis having been verified by the microscope), in which remarkable therapeutic results were obtained by the use of iodine dissolved in a saturated solution of potassium iodide. Under applications of this solution the disease disappeared entirely, on one hand, and was greatly improved on the other, after three or four months.

Treatment of a Case of Leprosy by Hypodermatic Injections of Chaulmoogra Oil.—TOURTOULIS-BEY (*Annales de Dermatologie et de Syphiligraphie*, 1899, No. 7) reports a case of leprosy greatly improved by chaulmoogra oil administered hypodermatically. The patient, who was a native of Upper Egypt, presented well-marked symptoms of the disease, which was of the mixed variety and began at fifteen years of age. Chaulmoogra oil was at first prescribed in thirty to fifty drop doses by the mouth. At the end of two months there was decided improvement, but the patient was obliged to give up the oil because of the nausea and vomiting it produced. Later it was again tried, but had again to be abandoned as before. Hypodermatic injections were now used, and after fifty injections of five grammes each the lesions began to undergo retrogression. After six years of this treatment the patient was practically well.

Two Epidemics of Alopecia Areata in an Asylum for Girls.—BOWEN (*Journal of Cutaneous and Genito-urinary Diseases*, September, 1899) reports two epidemics of alopecia areata in an institution for homeless girls between the ages of three and fourteen years. The first case occurred in a girl, eleven years old, who when first seen presented three round, bald patches upon the crown of the head, clinically typical of alopecia areata. Several weeks later another girl was found to have a bald patch upon the crown, which increased rapidly in size for a time. Four months after the discovery

of the first case a large number of the girls in the asylum were suddenly found to be affected. After cutting the hair of all the children it was found that sixty-three of the sixty-nine girls had bald areas upon the scalp. One girl, who had just entered the institution, acquired a patch in three days. After two months the disease appeared to come to a standstill; at the end of six months almost all the bald patches were covered with hair. No trace of micro-organism was found. No adult inmate of the asylum was attacked. Six years after this epidemic the first patient, having been absent from the asylum for three years, was readmitted. A month or six weeks afterward one of the children was discovered to have a bald patch, and four or five months later twenty-six of forty-five children were affected in a similar manner.

A Vesicular Eruption Cured by Circumcision.—BULKLEY (*Journal of Cutaneous and Genito-urinary Diseases*, October, 1899; *Transactions of the New York Dermatological Society*) reports a case of troublesome vesicular eruption occurring in a child, four months of age, for which no other cause could be found but a long and adherent prepuce. The eruption was regarded as a reflex herpes, and circumcision was advised, without any other treatment. Three weeks after the performance of circumcision the eruption had completely disappeared, having previously lasted four months and having resisted all local treatment.

Keloid Treated by Electrolysis.—CROCKER (*British Journal of Dermatology*, July, 1899) exhibited before the Dermatological Society of Great Britain and Ireland a female patient with keloid between the scapulæ, which had followed a burn five months previously. The growth was very prominent, of a bright red color, and was accompanied by much itching and slight pain. After the employment of electrolysis at four sittings a fortnight apart the growth was much shrunken and paler, and the itching and discomfort disappeared. The needle was inserted for a minute at a time, the punctures being about one-quarter of an inch apart, and the current strength used was about five milliampères.

Value of Arsenic in Dermatitis Herpetiformis.—A physician residing in India (*British Journal of Dermatology*, July, 1899), gives his personal experience, extending over several years, with this disease, and points out the striking amelioration of the disease during attacks of malarial fever and other intercurrent disorders, and the benefit derived from the use of arsenic in full doses.

Kakodylate of Sodium in Psoriasis.—NEUMANN (*Archiv für Dermatologie und Syphilis*, Band xlix., Heft 1), at a séance of the Vienna Dermatological Society, exhibited two patients with psoriasis who had been treated by injections of kakodylate of sodium. The first patient, a girl, nineteen years old, who had not been treated before her entrance into the hospital, received at first injections of a solution 2 : 20; later the strength of the solution was increased to 4 : 20 and then to 6 : 20. After twenty injections the eruption, which was a very extensive one, began to undergo involution, and after thirty

the scales fell off, leaving smooth, red spots. Although the amount of kakodylate of sodium given contained about ten grammes of arsenic, no unfavorable effects were produced. The second patient was also a young woman, twenty years of age, with an extensive eruption. She received daily injections of a 20 per cent. solution.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

W. T. COUNCILMAN, M.D.,

SHATTUCK PROFESSOR OF PATHOLOGICAL ANATOMY, HARVARD UNIVERSITY,

AND

F. B. MALLORY, M.D.,

ASSISTANT PROFESSOR OF PATHOLOGICAL ANATOMY, HARVARD UNIVERSITY.

Metastatic Embryonal Glandular Tumors in the Region of the Kidney in Children.—ENGELKEN (*Beiträge zur path. Anat. und zur allg. Path.*, 1899, xxvi. p. 320) reports a renal tumor in a four-year-old girl, which was diagnosticated as sarcoma of the liver. The latter organ was apparently enlarged, and presented two large nodular growths on the upper anterior surface. The lower third of the kidney projected from the kidney mass, which had grown upward into the vena cavæ and extended into the cavity of the right auricle. There were many metastases in the liver and peritoneum, and one nodule in the right lung.

The tumor consisted of sarcoma-like cells, with connective tissue and blood-vessels, smooth muscle fibres, and gland-like structures, with alveolar formations, as well as actual lumina, lined by one or more layers of cuboidal or cylindrical cells. The lumina appeared to be in the oldest parts of the tumor, while the rest seemed embryonal. The metastases showed the same structure as the tumor, and arose from the sarcoma-like or parenchymatous cells.

Hemorrhages were noticed in places, due to congestion and to thrombosis. Necrosis followed the diminution of blood supply, and when old showed areas of blood pigment. No glycogen or fat was observed. Peritoneal metastases came from rupture of the capsule of the liver tumor and lung metastases from the blood. The retroperitoneal lymph nodes showed no metastases.

Twenty-eight cases of similar embryonal tumors were collected, tabulated, and divided into three groups: First, those with sarcoma-like masses, epithelial gland-like structures, and smooth muscle fibres; second, those with striated muscles as well; and, third, those containing other tissues, such as cartilage. In most of these cases the kidney tissue was not preserved, hence he concludes that the embryonic anlage of the kidney was involved as well as the Wolffian body. If the latter did not undergo complete regressive changes a tumor might develop, but this is rare. Striated muscle and

cartilage might possibly come from the vertebral plate, while smooth muscle might undergo metaplasia into striated fibres.

Hydrocephalus and Hypoplasia of the Suprarenals.—CZERNY (*Centralbl. f. allg. Path. u. path. Anat.*, 1899, Band x., No. 7, Plate I.) has studied the adrenal glands from five children with hydrocephalus and from twenty children with normal glands. Macroscopically there was no difference, but microscopically the glands from hydrocephalus cases showed an atrophy of the medulla, even to its complete disappearance. In such cases the inner surfaces of the cortex were separated merely by the central veins.

To discover any possible connection between the cerebral ventricles and the adrenals he injected Berlin blue into the ventricles of young white rats. The pigment appeared first in a lymph vessel, which gave off a twig to the adrenals and then passed on to the pelvis. Similar experiments on narcotized dogs and cats were negative, due, Czerny thinks, to the fluid rapidly entering the veins and becoming diffusely spread.

The changes observed in the glands of children were on both sides and equal. No regressive metamorphoses or remains of such were noticed; hence, Czerny thinks the changes were developmental anomalies.

Cell Inclusions in Carcinomata and their Relation to the Blastomycetes.—C. STERNBERG'S (*Beiträge zur path. Anat. und zur allg. Path.*, 1899, xxv. 554) conclusion is that the study of this question has added much to our knowledge of cell-structure, but has added nothing to our knowledge of the etiology of malignant tumors.

In reviewing the literature he finds that the demonstration of these structures rests chiefly on their morphology and their reaction to stains. Certain so-called "specific stains" have been devised by Sanfelice and modified by Roncali, Aievoli, Secchi and others. After trying several of these he secured the best results with that of Aievoli. This he finds is an unimportant modification of Gram's method, as also a number of the other "specific stains." Control specimens stained by Gram's method give practically the same results.

He investigated first an adenocarcinoma of the ovary, which, in portions of the tumor, had the structure of carcinoma simplex. Metastases occurred in the liver, kidney, and spongiosa of the bones. In the latter position they had an osteoplastic nature. Sections, especially from the non-glandular portions of the tumor and its metastases, stained simply with hæmatoxylin and eosin showed the following structures in the tumor cell:

(*a*) Unstained areas, occasionally containing variously-formed structures staining intensely blue.

(*b*) Structures of various forms staining pale blue, homogeneously or irregularly.

(*c*) Pale-blue structures with a double contour.

(*d*) Pale-blue structures surrounded by an area staining with eosin.

(*e*) Structures staining deeply with eosin.

In general the same structures were shown by Gram's method. The structures classed under (*b*) remained unstained or pale, those under (*d*) unstained, and many of those under (*e*), in the cells, vessels, and other tissues,

stained bluish-black. Treated by Van Gieson's method the structures classed under (*b*) stained red and those under (*d*) stained blue.

From these results he draws the following conclusions: Structures classed under

(*a*) Represent vacuoles, occasionally containing one or more leucocytes.

(*b*) Probably represent stages of mucoid degeneration.

(*c*) Represent areas of calcification.

(*d*) and (*e*) represent white and red blood-corpuscles.

In a carcinoma of the breast the same results were obtained.

In epitheliomata he found all the intermediate stages between portions of the tissue staining by Gram's method and the structures regarded as cell inclusions. The normal stratum corneum and the keratinized tumor cells stained blue, leading in some cases to the production of peculiar figures that might be mistaken for parasites. Control specimens stained by ordinary methods, however, showed that they were due to keratinization in the cells. The muscle bundles retained the stain and in many cases were surrounded by a clear space, which might be mistaken for a capsule. A few of the nuclei of the leucocytes and of the carcinoma cells also retained the stain. Intranuclear structures corresponded to nucleoli. The kerato-hyaline granules of the stratum granulosum, the root-sheaths of hairs, hyaline, and colloid, were not decolorized by Gram's method.

Referring to the plates in the work of Binaghi he finds that the structures represented in Figs. 1 and 3 correspond to the cells here described as being in a state of mucoid degeneration; the structures in Fig. 2 he recognizes as stained red blood-corpuscles, those in Figs. 4 and 7 as keratinized cells and cell groups. He finds nothing satisfactory in the literature concerning the chemical and inoculation tests.

The Experimental Production of Cancer.—Lack (*Journal of Pathology and Bacteriology*, 1899, vi., 154) claims that he has produced cancer experimentally. He holds that carcinoma is simply the result of the entrance of the normal epithelium of the body into the lymph-spaces and its continued growth therein. To test this view he operated upon two rabbits. The ovaries were cut open and the raw surfaces scraped freely with the edge of the knife. The milky juice containing free epithelial cells was carefully allowed to diffuse through the peritoneal cavity. One of the animals died within forty-eight hours, the other remained well for nearly a year. Then it became gradually weaker and thinner, and was killed. Numerous white, hard nodules were found in the mesentery. The liver was greatly enlarged, and contained many cysts; thickly scattered through it were numerous small white patches, densely hard on section. The diaphragm was infiltrated with dense whitish tissue, and the parietal pleura, lungs, and uterus contained nodules similar in appearance to those in the mesentery. Microscopically they were shown to consist of alveolar spaces lined by one or more layers of columnar epithelial cells. The tumors had all the characteristics of an ovarian cancer.

As is well known, diffuse cancer of the peritoneum has followed removal of ovarian cysts. The fluid in these cysts contains free epithelial cells, and the explanation universally given, that in cases where this dissemination of

malignant disease has occurred the original cysts were malignant, is in the writer's opinion not always the true one.

[Although cancer in rabbits is extremely rare, if it occur at all, a solitary case like this, no matter how convincing, must be viewed with suspicion until mere coincidence is ruled out by further experiments.—ED.]

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

CHARLES HARRINGTON, M.D.,
ASSISTANT PROFESSOR OF HYGIENE, HARVARD MEDICAL SCHOOL,

AND

EDWARD F. WILLOUGHBY, M.D.,
OF LONDON.

Oil as a Preservative of Meats.—Oil is used in the household in various parts of Italy for keeping meat fresh, and it has been used extensively for ages in preserving wines; but it has long been known that access of air is not thereby wholly prevented, and it has been proved that even the evaporation of water beneath it can proceed to some slight extent. To determine the preservative influence of oil, DR. CONSTANTINE X. HIEROCLÈS (*Archiv für Hygiene*, xxxiii., 155) made a series of experiments. He found that parts of a piece of ordinary beef placed in flasks, covered with oil to a depth of 3 cm. and kept at 7° C., at room temperature, and at 28° C. showed bacterial growth of, respectively, 1845, 2572 and 2950 times the number originally present. Then pieces of sterile meat of various kinds were kept under the same conditions, but in all cases growth appeared after a time, though much of it originated in the oil itself, even though this had been exposed to 100° C. for half an hour. To determine the inhibiting action of oil on bacterial growth he took two fresh agar cultures of each of the following: proteus vulgaris, B. subtilis, B. megaterium and B. anthracis, and to one of each pair he added oil up to the cotton stopper. All eight tubes were kept at 28° C. It was soon demonstrated that the growths under the oil were much less active than the others. He points out that in warm climates the method may be of advantage, since it does not interfere with bacterial multiplication and protects the meat from contamination through contact of insects. Moreover, the outer portions are not dried up, and the whole can be used.

Bedbugs and Fleas as Agents in the Spread of Disease.—More or less evidence has been adduced from time to time to show that bedbugs, fleas, and other insects act as carriers of disease germs. Cases have been reported by CARMICHAEL showing a connection between bedbugs and leprosy, and by CRAIG, connecting this bug with tuberculosis and cancer. The flea, having been observed on rats dying of the plague, is supposed by Simond and Yersin to play a part in the spread of that disease. Now comes a series of carefully

conducted experiments by Dr. George H. F. Nuttall (*Centralblatt für Bakteriologie*, Abth. I., xxiii., No. 15), in which bedbugs and fleas were given the opportunity to transfer anthrax, chicken cholera, and mouse septicæmia. He obtained some bedbugs and allowed them to suck the blood of diseased and dead mice, and then transferred them to healthy mice. Fleas found on diseased mice were similarly transferred. In other experiments the insects were placed upon healthy mice from which the hair had been shaved in spots whereon anthrax matters were painted. Although individual animals were bitten by as many as twenty-nine bedbugs and eight fleas, the results were all negative. Inoculations with the viscera of the bedbugs, however, were uniformly successful, even when considerable time had been allowed to elapse. With anthrax and chicken cholera, infection occurred after four days, and with mouse septicæmia after six. Their excreta also were infective. Infection with the organs of the fleas was unsuccessful eight hours after removal. Nuttall concludes that when these insects bite they remove any transferred organisms immediately by sucking, but that infection can occur when the person being bitten slaps and crushes the insect and then scratches the spot.

Action of Soil on the Plague Bacillus.—Dr. Z. Yokote (*Centralblatt für Bakteriologie*, Abth. I., xxiii., No. 24) took mice that had died of infection with plague bacilli placed them in wooden boxes, and buried them in garden soil which was kept from thorough drying. The boxes were exhumed from time to time and the contents examined to ascertain if infective material still existed. The longest time that elapsed between the burying and the demonstration of the still virulent organism was thirty days, and the higher the temperature and the more active the rate of decomposition the shorter the life of the organism. The soil in the immediate vicinity of the boxes was examined for the organisms, but the results were negative.

Concerning the Use of Meat from Diseased Animals.—Dr. Fritz Basenau (*Archiv für Hygiene*, xxxii., 219) makes some recommendations which may have some economic importance. A certain group of diseases seems especially liable to render meat injurious, but an animal slaughtered on account of sickness is not necessarily unfit for food, especially if the food be not eaten raw. Ordinary macroscopic examination will not show whether any infection resides in the meat itself, but bacteriological and feeding experiments will determine whether it may be used. He recommends that in case an animal is slaughtered while sick and it is desired to use the flesh as food, the bacteriological examination be begun within twenty-four hours, during which interval any organisms present will probably multiply. In healthy animals no bacteria are found within the muscles even after long keeping. At the time of starting the bacteriological examination feeding experiments should be begun also, mice being fed upon the raw meat, and others with meat that has been kept at the temperature of boiling water for an hour. If no colonies are observed in twenty-four hours, and no bacteria are demonstrated by the microscope, the meat is good. If colonies are produced, reliance must then be placed on the feeding experiments. If the mice fed on raw meat die and the others survive, the inference is that the meat may be cooked and eaten; if both sets die, the meat may not be used as food. Base-

nau examined the meat of a number of cattle that had suffered from various septic processes, and found it to be more or less rich in bacteria. The diseases included chronic pyæmia, septicæmia cryptogenetica, abscessus lienis traumaticus, paralytic puerperal fever, and perforation peritonitis. The bacteria found approach closely his *bacillus bovis morbificans*, but with some differences. All killed mice used in feeding experiments quickly and surely. Some produced poisonous matters which could withstand even the boiling temperature. In all probability these bacteria are pathogenic to man, for they resemble or are identical with the bacteria which have been isolated as the exciting cause in different outbreaks of meat-poisoning.

Dr. Lardier (*Revue d'Hygiène*, 1898, 431) instances a case in which a cow dead of anthrax was eaten by a large number of people without the slightest ill effects. Not so fortunate, however, were those who handled the carcass, which was the cause of a series of fatalities. Two men who helped skin the animal had typical charbon, but recovered. A calf belonging to one of them was seized with the disease and died, and in the removal of its hide another man was pricked, and, in consequence, died. The head of the cow was sold to a woman, who wounded herself in cutting it up, and died. The skin of the cow was sold to a man who stored it in a shed on his farm, and a few days later one of his cows dying of the disease, a post-mortem examination was made, and in the process the operator wounded himself, and died. In addition, from seven to ten cats that ate of the refuse and blood of the original cow all died suddenly shortly afterward.

Zinc as a Normal Constituent of Drinking-water.—Carl Th. Morner (*Upsala Läkareförens*, 1898, iii., through *Hygienische Rundschau*) examined the water of a well in the country near Upsala, which, in spite of a peculiar taste, had been in daily use for a year. Analysis showed traces of iron and no less than 8 milligrammes of zinc to the litre present as a carbonate. No disturbance whatever of the health of any of the persons who had been using the water constantly during the year had occurred.

[This case adds to the evidence against the cumulative action of zinc. Two wells which yield water containing notable amounts of zinc are known to have been in constant use, one of them as the sole public well of a small German town, for more than a century, without, as far as known, causing any disturbance of health. There are several springs in the southern part of Missouri which contain very much larger amounts of zinc than any of the above mentioned.—C. H.]

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All communications should be addressed to

Dr. Alfred Stengel, 1811 Spruce Street, Philadelphia, U. S. A.

Or

Dr. Hector Mackenzie, 59 Welbeck St., Cavendish Sq., London, W., Eng.

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